

LEAGUE OF NATIONS

Health Organisation

REPORT
OF THE
INTERGOVERNMENTAL CONFERENCE
OF FAR-EASTERN COUNTRIES ON
RURAL HYGIENE

Held at Bandoeng (Java), August 3rd to 13th, 1937

GENEVA, 1937.

Intergovernmental Conference of Far-Eastern Countries on Rural Hygiene

REPORT BY THE PREPARATORY COMMITTEE.

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RAJASTHAN UNIVERSITY, UDAIPUR

[Communicated to the Assembly,
the Council and the Members of
the League.]

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REPORT OF THE INTERGOVERNMENTAL CONFERENCE OF FAR-EASTERN COUNTRIES ON RURAL HYGIENE

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FOREWORD.

HISTORICAL.

At the thirteenth session of the Assembly (1932), the representative of India, supported by the representative of China, expressed the hope that, as soon as funds permitted, the Health Organisation would hold a Rural Hygiene Conference for the Far East, on the lines of that held for Europe in 1931. The Health Committee referred the proposal to the Advisory Council of the Eastern Bureau, which in 1933 declared itself in favour of holding such a Conference. The proposal was repeated and accepted by the Assembly at its fifteenth ordinary session (1934), when the desire was expressed that the Conference should meet in the not-too-distant future.

The Health Committee having proposed that the Conference should be held in 1937 at Bandoeng, in compliance with the kind invitation of the Netherlands Government, the Council approved this recommendation and sanctioned (January 1936) the constitution and despatch to the Far East of a Preparatory Committee of three members¹ which, from April to August 1936, visited the following countries: India, Burma, Siam, Malaya, Indo-China, the Philippines, the Netherlands East Indies and Ceylon.

¹ Mr. A. S. HAYNES, C.M.G., formerly Colonial Secretary of the Straits Settlements (*Chairman*); Professor C. D. DE LANGEN, formerly Dean of the Faculty of Medicine of Batavia; and Dr. E. J. PAMPANA, of the Health Section of the League of Nations Secretariat, Secretary of the Malaria Commission.

This Preparatory Committee stated in its report the fundamental terms to which the problem of rural medicine and health can be reduced in the conditions in which it presents itself in the Far East (document C.H.1234).

The Agenda of the Conference was drawn up by the Health Committee after consultation with the Preparatory Committee and was approved by the Council on October 10th, 1936, when the Secretary-General was authorised to convene the Conference in Bandoeng for August 3rd to 13th, 1937. The letters of convocation stated that, in view of the nature of the Agenda, delegations should represent all the activities having an influence on rural hygiene: health, civil administration, rural reconstruction, agriculture, education, co-operatives, social questions.

CHIEF PROBLEMS.

The annotated Agenda communicated to Governments on October 12th, 1936, was divided into five main chapters. The full text of this document¹ is reproduced below :

AGENDA.

I. *Health and Medical Services:*

1. Principles governing their organisation.
2. Personnel :
 - (a) Doctors ;
 - (b) Auxiliary staff.
3. Curative and preventive activities.
4. Budgets.

II. *Rural Reconstruction and Collaboration of the Population.*

III. *Sanitation and Sanitary Engineering:*

1. Housing.
2. Water supply.
3. Disposal of house refuse and other wastes.
4. Campaign against flies.

¹ Conf. Hyg. Rur. Orient 1.

IV. *Nutrition :*

1. Composition of food and methods of its preparation.
2. Nutritive value of the principal foods peculiar to the East.
3. Minimum cost of adequate nutrition and allowance for food in family budgets.
4. Diet and health. Deficiency diseases.
5. Plans for a co-ordinated nutrition policy based on the collaboration of the health, educational and agricultural services.

V. *Measures for combating Certain Diseases in Rural Districts.*

1. Malaria.
2. Plague.
3. Ankylostomiasis.
4. Tuberculosis.
5. Pneumonia.
6. Pian (yaws).
7. Leprosy.
8. Mental diseases and drug addictions.

COMMENTS.

I. HEALTH AND MEDICAL SERVICES.

1. *Principles governing the Organisations*

In some countries, medical care and health work are carried out by the same staff ; in others, there are separate parallel services for curative medicine and public health, sometimes placed under one authority.

It is necessary to determine—due account being taken of local factors and financial considerations—the respective merits of the principles of single and dual control. Where the services have been separated, it would be of interest to define in what way the indispensable collaboration of these services might be assured.

The frame of the organisation best adapted to meet the needs of the various Eastern countries as regards curative medicine and public health requires to be defined. How far can decentralisation go to-day, taking into account communication facilities and local conditions ?

The aim of any system of public health is, fundamentally, the well-being of the population. To be successfully achieved, the collaboration

of various departments, health, education, veterinary, public works, and finance is required. How can the necessary co-operation between these various services, and the different departments of the administration be assured ?

The task is very great whilst the funds placed at the disposal of health administrations are limited. How can the best results be obtained ? It is clear that a plan of action is required which takes into account the relative importance of the various problems and the possibilities of their solution.

2. *Personnel.*

(a) *Doctors.*

The proportion of doctors to the rural population is still too small ; efforts must therefore be made to obtain the best results with the existing medical corps, and by careful recruiting, to increase their number. The question of the technical training of practitioners arises in this connection. This question has been solved in two ways ; academic training with equal standard to that given in the Universities of the Metropolis and creation of a diploma which, while conferring the right to practice, does not require such long and full study. Both these systems are applied in the East, and a discussion of their respective advantages, in the light of experience gained, would be of interest.

The question of the recruiting of prospective practitioners is intimately linked with that of secondary education. Here, again, the requirements for admission to Schools of Medicine vary in different countries.

Once in possession of the right to practice, the young doctor, if he has not already been recruited for the public health service, is attracted by the town ; how can he be induced to set up practice in a village ? That is a question affecting the well-being of rural populations which demands the permeation of medical men.

(b) *Auxiliary staff.*

Curative and preventive work in country districts is, and will long remain, in the hands of auxiliary staff. The work of outlying dispensaries, for example, is often carried out by dressers. The problem of their technical training has been met in various ways in different countries, owing to the fact that their rôle is also interpreted differently ; should the duties of the dressers be limited to bandaging and the dispensing of a few harmless medicines, or should he be made into a kind of doctor's assistant, capable of making a diagnosis and treating ordinary ailments ?

The recruiting of nurses, visiting nurses and midwives encounters difficulties in certain regions owing to religious prejudices and the low level of education of young girls. How can they be attracted to these

professions and given adequate training and a suitable status ? A discussion of the varied experiences gained in this matter would prove useful.

3. *Curative and Preventive Activities.*

This item is a programme in itself. How can medical, surgical and prophylactic health work be made available to rural districts and profitably utilised by the inhabitants ? It is probable that the delegates to the Conference, in their preliminary reports, will describe the type of organisation considered adequate by the countries they represent. Does a type of medical service based on a central hospital with a network of dependent dispensaries give satisfaction ?

If a public health service is based on the principle of regional divisions, how can it be rendered more effective without unduly increasing its staff and budget ? Can this object be attained by concentrating efforts on certain selected districts ? What is the value of Health Centres or Units ?

4. *Budgets.*

Experience has shown that expenditure incurred in insuring good health has, in the long run, proved a good investment. Indeed, if the health of a population improves, this is followed by a rise in the economic level, which, in its turn, facilitates the participation of the local communities in the expense of medical and sanitary organisation ; it would be pertinent for the Conference to consider what efforts could be made in different countries in this direction. It would be of value also to ascertain the total expenditure per head of population and per year on public health and medical care from all sources (central, provincial and local budgets shown in absolute figures and in percentage of total expenditure, insurance systems, public or private enterprises, voluntary or charitable funds and organisations) and the approximate proportion of expenditure of each of the several sources

II. RURAL RECONSTRUCTION AND COLLABORATION OF THE POPULATION

In countries where unhygienic habits prevail and where the standard of life and education are very low, no efforts to improve public health will be lasting unless the advantages of such improvements can be grasped by the population, or unless they coincide with other improvements carried out in the fields chiefly interesting such people—namely, agriculture and economy.

When health measures have been enacted, there are two methods of applying them ; compulsion and persuasion. Although in cases of emergency, such as the necessity for vaccinating a population during epidemics of smallpox and cholera, compulsion may be justified, it is

nevertheless generally admitted that, if lasting results are to be secured, the wholehearted co-operation of the population must be obtained. This presupposes that the population grasps the importance of the results aimed at, thanks to an appropriate educational campaign. What can be done in this domain by the various grades of the civil administration, including the head of a village ? By teaching the principles of hygiene to the child at school, shall we succeed in securing his active collaboration in the future ?

Which of all the methods of health propaganda are those most likely to give the best results ? And would not efforts in this direction be more fruitful if they were mainly directed towards women upon whom the training of children and domestic responsibilities devolve ?

The movements in favour of rural reconstruction, initiated in India, have attracted the attention of the public and of Governments. Their aim is to raise the standard of life in country districts by concerted measures in the domains of health, agriculture, education and public economy. The importance of co-ordinating the activities of these agencies, official and non-official, is essential so that the effect on the peasant may be that of an ordered and coherent movement. Through what means can this co-ordination be effected and, if the " co-operatives " are the most suitable agency for the purpose, what practical steps can be taken to bring it about. This problem may well be discussed at the Conference by representatives of the various agencies concerned, such as agriculture, animal husbandry, irrigation, public health education and co-operative societies.

Improvement in the health of the masses must be one of the aims of rural reconstruction ; it may even be said that, in some districts, a plan of rural reconstruction is necessary for the improvement of health. This question of rural reconstruction is of such importance that the Conference will probably consider it advisable to entrust its study to a Commission.

III. SANITATION AND SANITARY ENGINEERING.

The subjects grouped under this heading have already been studied by the Health Organisation elsewhere than in the Far East.

The question of *housing* is included in its present programme of work. This subject was dealt with by the European Rural Hygiene Conference of 1931 and an International Exhibition of Rural Housing is to be organised under the auspices of the Health Organisation in 1937.

The problems of *drinking-water supplies* and the *destruction of refuse and other wastes* were also considered by the European Rural Hygiene Conference and will require to be dealt with from the point of view of the East, particularly as regards the question of latrines.

The Health Organisation has published a series of monographs on the *campaign against flies*, as well as a report prepared by entomologists¹ dealing with the question of manure heaps as breeding-places. In countries of the East, the problem presents other factors and a plan of study has already been worked out by an expert at the request of the Health Organisation.²

IV. NUTRITION.

In the preliminary report which was presented at the 1936 Assembly of the League of Nations, the Mixed Committee for the Study of the Problem of Nutrition, presided over by Lord Astor,³ emphasised the fact that the principal cause of deficient nutrition in any community is poverty, together with the ignorance which so often accompanies it.

To what extent do the observations made in European and North-American countries apply to the populations of the Far East?

It would seem useful for the Conference when discussing nutrition problems to consider on the one hand the documentary material contained in the Astor Committee's report and, on the other, the research carried out by Institutes in the East which have specialised in nutrition studies.

It is clear that the problem of nutrition raises such extensive and complicated questions that it may prove desirable for the Conference to appoint a commission to define them.

The nutritional habits of the majority of countries in the East are not definitely known, and the composition of their meals, as well as the chemical constituents and biological action of their staple foods, are

¹ "Fly-free Manure Heaps." — Ed. and Et. SERGENT. *Quarterly Bulletin Health Organisation*, Vol. III, page 299.

"Fly Control in Denmark." — Professor M. THOMSEN *Ibid*, Vol. III, page 304.

"The Fly Problem in Rural Hygiene." *Ibid*., Vol. V, page 211.

I. Report of the Meeting of Entomologists held in London on December 16th and 17th, 1935.

II. "The Biothermic Method of Fly Destruction and the Ease with which it can be adapted to Rural Conditions." — Professor ROUBAUD.

III. "Investigations into the Fly Density in Hungary." — F. LÖRINCZ and G. MAKARA.

IV. "On flies visiting human faeces in Hungary." — F. LÖRINCZ, M.D., G. SZAPPANOS, M.D., and G. MAKARA, M.D.

² "The Fly Problem in the East." Research Programme submitted by Professor B. A. R. GATER. (Document C.H./Hyg. rur/E.H.15(1).

³ "The Problem of Nutrition." Interim Report of the Mixed Committee for the Study of the Problem of Nutrition (document A.12. 1936.III.B, Vol. I).

being studied. On the basis of facts so obtained, the nutritive value of the daily food ration, expressed both in calories and in energy-producing and protective substances, the minimum cost of an adequate diet and the allowance for food in the family budget can be determined.

The Plenary Conference may also consider the relation between nutrition and health, on which subject the League of Nations has been carrying out investigations for some years.¹ The frequency, gravity and prophylaxis of deficiency diseases are other points upon which fuller information is required.

V. MEASURES FOR COMBATING CERTAIN DISEASES IN RURAL DISTRICTS

The question of the campaign against all diseases of concern to rural districts would be outside the scope of the Conference, which will perforce restrict itself to those constituting a social scourge, leaving its Bureau the option of accepting the discussion of other diseases if requested by delegates. Even among these, there are some of which further consideration would be superfluous since the methods of their prevention have been well established.

¹ "Progress of the Science of Nutrition in Japan," by Tadasu SAIKI. Document C.H.523.

"The Food of Japan," by Egerton Ch. GREY. Document C.H.681.

"Conference of Experts for the Standardisation of Certain Methods used in making Dietary Studies." *Quarterly Bulletin of the Health Organisation*, Vol. I, page 477.

"Diet in relation to Small Incomes," by W. R. AYKROYD. *Ibid.*, Vol. II, page 130.

"The Most Suitable Methods of detecting Malnutrition due to the Economic Depression." *Ibid.*, Vol. II, page 116.

"The Administrative Machinery by which the Adequate Nourishment of the Poor is ensured in Great Britain," by M. D. MACKENZIE. Vol. II, page 333.

"Nutrition and Public Health," by E. BURNET and W. R. AYKROYD. *Ibid.*, Vol. IV, page 323.

Report submitted to the Assembly on the Nutrition Problem. Document A.61.1936.III.

"Study of the Nutrition of Peasants in the Pellagra Area of Moldavia (Rumania)," by W. R. AYKROYD, ALEXA and J. NITZULESCU. Document C.H.1205.

Special Nutrition Number of the *Quarterly Bulletin of the Health Organisation* (Vol. V, No. 3, September 1936) containing among others:

(a) Report on the Physiological Bases of Nutrition drawn up by the Health Committee's Technical Commission.

(b) Documentary material from France and the Netherlands.

"Nutrition in Various Countries." Document A.12(b).1936, Vol. III.

"Statistics of Food Production, Consumption and Prices." Document A.12(c).1936, Vol. IV.

There remain a number of diseases, of which some are more or less the natural lot of rural districts, such as plague, ankylostomiasis and yaws, while others like leprosy have not so far been suppressed for want of effective prophylaxis, and yet others, such as tuberculosis and pneumonia, presenting special symptoms among races of the East and in tropical climates. The Conference will probably confine itself to a discussion of the campaign against these diseases.

In addition, the question of the policy to be adopted with regard to the disposal of the mentally deranged calls for discussion; should the practice of providing asylums be adhered to, or should the solution provided by agricultural colonies be adopted?

Separate consideration will have to be given to the campaign against rural malaria, a predominating problem of rural life in certain regions. Its study might with advantage be entrusted to a committee of experts.

PREPARATORY WORK.

Each of the five main chapters of the Agenda was commented upon in special reports presented by Rapporteurs appointed by the Health Committee. The following gentlemen accepted this important task:

I. *Health and Medical Services:*

Dr. C. C. CHEN, Director of the Ting-Hsien Institute, Hopei Province (document C.H.1253, No. 2);

Dr. P. DOROLLE, Médecin de 1^{re} classe de l'Assistance médicale, Hanoi, Indo-China (document C.H.1253, No. 1);

Dr. V. W. T. MCGUSTY, O.B.E., Secretary for Native Affairs and Inspecting Medical Officer, Suva, Fiji (document Conf. Hyg. Rur. Orient 15);

Mr. T. MIYAZAKI, Secretary of the Sanitary Bureau, Home Department, Tokio (document Conf. Hyg. Rur. Orient 11).

II. *Rural Reconstruction:*

Lt.-Colonel A. C. CHATTERJI, M.D., D.P.H., I.M.S., Director of Public Health, Bengal (document Conf. Hyg. Rur. Orient 14).

III. *Sanitation and Sanitary Engineering:*

Dr. S. F. CHELLAPPAH, O.B.E., Assistant Director of Medical Services, Colombo (document C.H.1253(b), No. 1) ;

Dr. N. D. R. SCHAAFSMA, Director of Experimental Station for Water Purification, Bandoeng, Java (document C.H.1253(b), No. 2).

IV. *Nutrition :*

Dr. W. R. AYKROYD, Director of Nutrition Research Laboratory, Indian Research Fund Association, Coonoor, India (document C.H.1253(c), No. 2) ;

Dr. T. SAIKI, Ph.D., Director of the Imperial Government Institute for Nutrition, Tokio (document unnumbered, will be C.H.1253(c), No. 3) ;

Dr. A. G. VAN VEEN, Head of the Chemical Department of the Medical Laboratory, Batavia (document Conf. Hyg. Rur. Orient 16) ;

Professor Hsien Wu, Professor at Peiping Union Medical College (document C.H.1253(c), No. 1).

V. *Measures for combating Certain Diseases in Rural Districts:*

Dr. P. H. J. LAMPE, Director of the Central Institute for Leprosy Research, Batavia (*Leprosy*), (document C.H.1253(d), No. 3) ;

Dr. C. MANALANG, Chief Pathologist, Culion Leper Colony, Bureau of Health, Manila, Philippines (*Leprosy*) (document C.H.1253(d), No. 2) ;

Dr. H. G. S. MORIN, Director of the Anti-malaria Service of Indo-China (*Malaria*) (document C.H.1253(d), No. 4) ;

Dr. WU LIEN-TEH, Director of the National Quarantine Service, Shanghai (*Plague*) (document C.H.1253(d), No. 1) ;

Professor C. D. DE LANGEN, formerly Dean of the Faculty of Medicine, Batavia, member of the Preparatory Committee (*Tuberculosis*) (document Conf. Hyg. Rur. Orient 13).

National reports, prepared by the Governments of Burma, Ceylon, China, India, French Indo-China, Japan, Malaya, Netherlands Indies, Philippines and Siam, and also reports on the Colony of Hong-Kong, North Borneo, Sarawak, the Colony of Fiji, the Gilbert and Ellice Islands Colony, the British Solomon Islands Protectorate, the New Hebrides Condominium and Tonga, on the basis of the annotated agenda of the Conference, provided a valuable material for discussion.

The Public Health Service of the Netherlands Indies was good enough to organise during the Conference an International Exhibition consisting of national documentation and material sent by Burma, Ceylon, China, India, French Indo-China, Japan, Malaya, Netherlands Indies, Siam, and the Eastern Bureau of the Health Organisation.

CONFERENCE.

The League of Nations Council, in May 27th, 1937, appointed Dr. OFFRINGA to be President of the Conference and approved the draft Rules of Procedure.

The following Governments sent delegations to the Conference (for full list of delegates, see pages 17 to 22) :

British North Borneo,	French Indo-China,
Burma,	Japan,
Ceylon,	Malaya,
China,	Netherlands Indies,
Fiji and Western Pacific,	Philippine Islands,
Hong-Kong,	Siam,
India,	

while observers were sent by the Netherlands Indies Civil Service, the Royal Association Colonial Institute, Amsterdam,

the Rockefeller Foundation, the Central Bureau of Statistics, Batavia, the Far-Eastern Association of Tropical Medicine, the International Institute of Agriculture, Rome, and the League of Red Cross Societies, Batavia.

The Conference was opened by His Excellency the Governor-General of the Netherlands Indies, Jhr. Tjarda VAN STARCKENBORGH STACHOUWER and called to its Bureau, in addition to the President, the Secretary-General, Dr. J. M. ELSHOUT, Head of the Netherlands Indian Military Medical Service, and the leaders of the following delegations :

British Malaya,	French Indo-China,	Netherlands Indies,
Burma,	India,	Philippines,
China,	Japan,	Siam,

as well as the members of the Preparatory Committee.

Five main Committees were constituted for the discussion of the five principal subjects, under the Chairmanship of :

Dr. J. L. HYDRICK (Netherlands Indies) for the First Committee ;

Sir Mirza M. ISMAIL (India) for the Second Committee ;
The Hon. Dr. R. D. FITZGERALD, M.C., (Malaya) for the Third Committee ;

M. VINAY (French Indo-China) for the Fourth Committee ;
Professor DE LANGEN (Utrecht) for the Fifth Committee.

Technical groups and sub-committees were formed as follows for the study of special questions :

Committee No. I.

Medical education.
Budgets.
International survey of
Eastern countries con-
cerning methods and
costs.

Committee No. III.

Fly control.

Committee No. IV.

Technical group on nutrition.

Committee No. V.

Malaria.
Leprosy.
Plague.
Tuberculosis and pneumonia.
Ankylostomiasis and yaws.
Mental diseases.

The reports of the five Committees were adopted unanimously and, taken together, constitute the body of the reports, recommendations and resolutions of the Conference, which closed on August 13th, 1937.

LIST OF DELEGATES.

BUREAU OF THE CONFERENCE.

President: Dr. J. OFFRINGA, Director of the Netherlands Indian Public Health Service, Batavia.

Vice-Presidents: The Leaders of the Delegations.

Honorary Member: Dr. J. M. ELSHOUT, Head of the Netherlands Indian Military Medical Service, Bandoeng.

Preparatory Committee.

General Secretary. Dr. L. RAJCHMAN, Director of the Health Section of the League of Nations, Geneva.

REPRESENTATIVES OF THE LEAGUE OF NATIONS.

1. Dr. L. RAJCHMAN, Director of the Health Section of the League of Nations, Geneva.
2. Dr. C. L. PARK, Director of the Eastern Bureau of the Health Section of the League of Nations, Singapore.
3. Dr. B. BORCIC, Health Organisation of the League of Nations, Shanghai.

PREPARATORY COMMITTEE.

1. Mr. A. S. HAYNES, C.M.G., formerly Acting Colonial Secretary of the Straits Settlements (England).
2. Professor Dr. C. D. DE LANGEN, formerly Dean of the Faculty of Medicine of Batavia (Utrecht).
3. Dr. E. J. PAMPANA, Secretary of the Malaria Commission, member of the Health Section of the League of Nations, Geneva.

DELEGATES.

British North Borneo.

1. Dr. J. C. T. TREGARTHEN, District Surgeon, Tenom.

Burma.

1. Colonel N. S. SOHAI, M.C., I.M.S., Inspector-general of Civil Hospitals, Rangoon (Leader).
2. Major C. A. BOZMAN, Director of Public Health Burma, Rangoon.
3. Dr. B. P. SRIVASTAVA, M.B., B.S., D.P.H., Health Officer, Corporation, Rangoon.
4. Dr. U. TIN, Malariologist, Harcourt Butler Institute of Hygiene, Rangoon

Ceylon.

1. Dr. S. F. CHELLAPPAH, O.B.E., Assistant Director of Sanitary Services, Colombo.

China.

1. Dr. WU LIEN-TEH, Director, National Quarantine Service, Shanghai (Leader).
2. Mr. CHANG FU-LIANG, Director of Kiangsi Rural Welfare Centres, Ministry of Industries, Nanchang, Kiangsi.
3. Dr. HOU HSIANG-CHUAN, Associate of the Henry Lester Institute of Medical Research, Shanghai.
4. P. K. TAO, Senior Sanitary Engineer, Central Field Health Station, Nanking.
5. Dr. C. Y. WU, Technical Expert, National Health Administration and Senior Officer of the Quarantine Service.

Fiji and the Western Pacific.

1. Dr. V. W. T. MCGUSTY, O.B.E., Secretary for Native Affairs and Inspecting Medical Officer, Suva (Leader).
2. Dr. S. M. LAMBERT, Suva.

Hong-Kong.

1. Dr. D. J. VALENTINE, M.C., Deputy-Director of Medical Services, Hong-Kong.

India.

Government of India :

1. Amin-ul-Mulk Sir Mirza Muhammad ISMAIL, K.C.I.E., O.B.E., Dewan of Mysore State, Bangalore (Leader of the British-Indian Delegation).
2. Lieut.-Colonel E. CORTER, I.M.S., Deputy Public Health Commissioner with the Government of India, Simla.
3. Major H. W. MULLIGAN, I.M.S., Acting Director, Malaria Survey of India, Kasauli.
4. Dr. W. R. AYKROYD, Director of Nutrition Research Laboratory, Coonoor.

Local Governments :

5. *Government of Madras* — Dr. P. F. RUSSELL, A.B., M.B., M.P.H., International Health Division of the Rockefeller Foundation, King Institute of Preventive Medicine, Guindy.
6. *Government of Bengal* — Lieut.-Colonel A. C. CHATTERJEE, I.M.S., Director of Public Health, Bengal, Calcutta.
7. Dr. D. N. ROY, Assistant Professor of Entomology, School of Tropical Medicine, Calcutta.
8. *Government of Punjab* — Lieut.-Colonel C. M. NICOL, I.M.S., Director, Public Health, Punjab, Lahore.
9. *Government of Bihar* — Dr. Mojibur RAHMAN, D.P.H., Officiating Personal Assistant to the Director of Public Health, Bihar, and Officer in Charge of Public Health Bureau, Bihar, Bankipur.

Indian States :

10. *Nizam Government* — Dr. C. F. CHENNY, Deputy Director of Public Health, Hyderabad.
11. *Travancore Government* — Dr. Spencer HATCH, District Secretary, Y.M.C.A., for Travancore and Cochin, Trivandrum.
12. Dr. P. PARTHASARATHI, Director of Health, Mysore
13. Mr. R. V. DESAI, Registrar, Co-operative Societies, Baroda State.
14. Mr. C. V. SANE, Deputy Director of Agriculture, Baroda State

Indian Research Fund Association :

15. Dr. R. ROW, M.D.

French Indo-China.

1. M. F. X. VINAY, Senior Administrator, Civil Service (Leader).
2. Dr. P. M. DOROLLE, Médecin de 1^{re} classe de l'Assistance médicale, Hanoi (Secretary).
3. M. AUTRET, Chemist, Head of the Chemical Laboratory, Pasteur Institute, Hanoi.
4. Dr. P. L. CHESNEAU, Médecin de 1^{re} classe de l'Assistance médicale, Hanoi.
5. Professor H. GALLIARD, Professeur agrégé, Faculty of Medicine, Paris; Director of the Medical School, Hanoi.
6. M. G. KALESKI, Senior Engineer, Public Works Department.
7. Dr. H. G. S. MORIN, Director of the Anti-malaria Services, Indo-China.
8. Mr. G. L. OUDOT, Agricultural Engineer.
9. M. TRAN VAN THIN, Medical Officer.

Japan.

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2. Professor Dr. M. KOIZUMI, Medical Faculty, the Keio University.
3. Mr. T. MIYAZAKI, Secretary, Sanitary Bureau, Home Department, Tokio.
4. Dr. Y. MINAMIZAKI, Medical Officer, Sanitary Bureau, Home Department, Tokio.
5. Professor T. SAIKI, Director of the Imperial Institute of Nutrition Research, Tokio.
6. Dr. K. SHIMOJO, Medical Officer of the Government-General of Taiwan, Formosa.
7. Professor Dr. R. YAMAMOTO, Imperial University, Taihoko, Formosa.

Malaya.

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3. Hon. Dr. R. D. FITZGERALD, M.C., Director of Medical Services, Straits Settlements, and Adviser, Medical Services, Malay States, Singapore.
4. Mr. A. KEIR, Acting Director of Education, Straits Settlements and Adviser on Education, Malay States.
5. Captain A. G. ROBINSON, Director of Drainage and Irrigation, Kuala Lumpur.
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3. Professor Dr. J. E. DINGER, Director of the Queen Wilhelmina Institute for Hygiene and Bacteriology, Batavia.
4. Professor Dr. W. F. DONATH, Delegate of the Department of Economics, Professor at the School of Medicine, Batavia.
5. Dr. J. L. HYDRICK, Adviser for the Hygiene Organisation of the Netherlands Indian Public Health Service, Batavia.
6. M. H. J. VAN MOOK, Delegate of the Department of Economics, Batavia.
7. M. W. MOOY, Delegate of the Military Medical Service, Military Hygiene Institute, Batavia.

8. Dr. J. G. OVERBELK, Head of the Malaria Control Service, Batavia.
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10. M. M. F. TYDFMAN, Delegate of the Department of Interior Affairs, Resident of Priangan, Bandoeng.
11. Dr. S. W. DE WOLFF, Inspector, Head of the Provincial Public Health Service of West Java, Batavia.
12. Professor Dr. P. M. VAN WULFFEN PALTHL, School of Medicine, Batavia.

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 2. Professor C. BONNE, School of Medicine, Batavia.
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 10. Dr. W. F. THEUNISSEN, Representative of the Far-Eastern Association of Tropical Medicine and of the International Institute of Agriculture, Rome.
 11. M. J. G. A. TEN SIETHOFF, Representative of the League of Red Cross Societies, Batavia.
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INTRODUCTION TO THE REPORT.

While it is obvious that attention to the problem of rural populations has been an important consideration of Governments for many years, it is evident that, since the Great War, there has been a marked increase in this direction. It is noticeable that the people of many countries and their Governments realise more strongly than ever that that part of the population living on the land and producing the essential foodstuffs for all has been too often neglected. Governments are realising more and more their obligations in this matter, and programmes working towards the bettering of the social, economic, health and cultural conditions of the country-dwellers are becoming more general and more comprehensive. Even in those countries where considerable progress has already been made, new and more complete activities are being fostered.

This present Conference had brought together Governmental representatives from the important countries of the East, who are in charge of a great variety of public services for the rural populations concerned. The group includes : medical men concerned with curative and preventive medical services, educators, agronomists, specialists in rural reconstruction, sanitary engineers, experts in nutrition, and investigators who are devoting their attention to specific diseases. Statesmen and members of the legal profession who are concerned primarily with administrative duties are also to be found in the group.

The Conference is very glad to note that, in response to the invitation from the League of Nations, the Governments have seen fit to include in their delegations men of such diversified interests. This may be taken as a positive indication that those responsible for the medical services and health protection of the rural populations in the East realise that their work is made difficult, if not impossible, unless activities in the fields of economics, sociology, agriculture and education are carried on at the same time.

The development of rural programmes reveals, in many instances, that the best results are to be obtained when the

different welfare activities are planned and executed simultaneously by a trained staff. The inter-relations of the work of the various groups have become more patent, and success in its broad lines rests on a realisation of the interdependence of the work of all concerned.

The Conference has studied the necessity for the Governments' undertaking the co-ordination of their present activities, both in planning and execution, so that a comprehensive and effective integration of Governmental work may be attained.

The discussions of the Conference have indicated time and again that, in practically all fields, there does not exist a programme which is applicable in all countries, even though the objectives are essentially in common.

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The group of administrators and experts concerned with *health and medical services* have considered extensively the many problems confronting them. One of the most important is that in connection with the collection of accurate vital statistics. Many countries in the East unfortunately have not yet brought together the statistical data to give them accurate information on mortality, natality, infant mortality, and morbidity. The development of a sound public health programme must necessarily rest on the basis of exact information.

Discussions with regard to the importance of the decentralisation of health and medical services have been thoroughly considered and, while there cannot at the present time be any uniformity in the applying of this principle, it is believed that the greatest benefit to the health of the rural populations, at the smallest cost, can be obtained through some process of decentralisation. Emphasis was laid, however, on the importance of proper control from the central authority and the adequate protection of the personnel as to their tenure of office. Continuity of service is essential for permanent results, not only in the medical and health services, but, indeed, in all other branches of work being carried on for the benefit of the rural populations.

An important and far-seeing recommendation deals with the constitution by Governments, during periods of financial

prosperity, of a reserve fund to be set aside for health and medical services in times of economic depression. The experience of the past few years has indicated that, at times when these services need to be particularly active, funds are not available.

The need for a comparative survey of health conditions in the different countries of the East has been one of the major topics considered. The Governments of the different countries are requested to study the possibility of taking part in a survey of this character. The proposals with regard to this survey cover items which ordinarily have not been included in health surveys. Especial attention is to be paid to economic and social conditions. This recommendation of those in charge of the health and medical services overlaps the suggestion made by the group who have been particularly considering rural reconstruction, and thus emphasises again that the medical and health workers feel incapable of obtaining the best results in their own work without an understanding of the social and economic factors involved.

* * *

The delegates concerned with the *general problem of rural reconstruction* have considered a very wide range of subjects. Great emphasis has been placed on the development and organisation needed in villages or groups of villages. It is strongly felt that, without adequate village organisation, rural reconstruction become difficult, if not impossible. Details of how this organisation can best be obtained have been fully discussed and the duties of village committees outlined; in addition to the activities which should be created in every village, or group of villages, the Conference urged the necessity for leading the rural peoples into the adoption, of their own free will, of plans for their betterment, rather than the imposing of such schemes on them by means of Government orders.

The role of women in rural betterment has also been chosen as a topic for a special resolution. In the Eastern countries, where women are becoming more and more significant in matters of this kind, this is of more than ordinary importance.

The inadequacy of the education frequently given in rural schools has been seriously considered and a minimum curriculum

for such schools outlined, which, if followed to its logical conclusion, should lead to a more rational education. This recommendation is based on the premise that the vast majority of children in the rural schools will continue to live in the country after they have become adults. Consequently, importance of training in agriculture has been stressed; proper facilities for health education, physical and citizenship training have been underlined as essentials of the curriculum of rural schools.

The Conference has also recorded its strong belief, and has urgently recommended to Governments, that studies of methods leading to land reform be made. It is felt that, if this problem is neglected, programmes of rural reconstruction not only will be greatly retarded, but will not be able to rest on a permanent basis.

The responsibilities of those concerned with rural reconstruction are heavy, and a note of warning has been sounded with regard to a too rapid development of work of this character unless there is assurance that the scientific and practical qualities of the activity has been seriously tested and tried in given areas before its general application is made. This emphasises the desirability of the best technical brains collaborating in connection with practical field tests in any or all of the large number of services included under rural reconstruction.

In a number of countries represented, experimental rural welfare centres have been created through which technical experts in the various fields have been carrying on practical studies and research in rural activities. These centres have already produced results which have been shown to be applicable in other regions, and attention is drawn to this procedure.

It is particularly stressed that it is futile, if not a backward step, to launch programmes which, however desirable, are not within the economic possibilities of the area concerned, or in line with the customs and educational level of the population involved.

Organised rural reconstruction is, in many countries, of very recent development, and the Conference has demonstrated conclusively that the various groups working in the different countries are not familiar with the activities carried out elsewhere. It has therefore been recommended that the League

of Nations make arrangements to collect and make available information regarding successful experiences of rural reconstruction in various countries. The approval of this plan would represent a forward step and the establishment of channels for interchange of information on rural reconstruction would be highly valuable.

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The *physical environment of rural peoples* has received full consideration at the hands of the sanitary engineers present at the Conference. It has been emphasised that one of the major tasks is to provide adequate facilities at a minimum of cost both for construction and maintenance. Problems dealing with housing, water supply, disposal of refuse and other wastes, and fly control have been discussed and specific recommendations reached. The usual unordered development of villages has lead to many of the difficulties which exist, and the adoption of the suggestion that Eastern Governments should create committees for small-village planning might in time produce results of inestimable value. The recommendations with regard to clean and safe water and the proper disposal of animal and human wastes are also of prime importance. The problem of the pollution of water in wells by pit latrines is recommended for investigation by Eastern Governments.

Flies are well-known carriers of disease ; it is clear that many points with regard to fly-breeding and its control, the diseases transmitted, and other information needs elucidation in Eastern countries. It is proposed that these investigations shall be co-ordinated through the Health Section of the League Secretariat.

The public health and economic aspects of the disposal of human excreta and other organic refuse is a matter of prime importance in many lands. The importance of composting which would render these dangerous substances innocuous but with important fertilising value is stressed.

The importance of village committees in connection with the sanitation of the villages has already been referred to.

Of the many subjects discussed during this Conference, that of the *problem of nutrition* among the peoples of the East is incontrovertibly of prime importance. One of the most significant of the recommendations has to do with the establishment in each country of National Nutrition Committees. These Committees, if created, should serve as rallying-points, not only for nutrition workers, but also for representatives of other Government departments whose activities are necessarily related to problems of diet and food supply. These would include representatives for public health, medicine, economics, education, agriculture, animal husbandry, and fisheries. These National Committees would have as a major responsibility the advising of their Governments on all matters pertaining to the food and diet of the population.

The training and employment of selected public health workers to carry out practical nutrition work is recommended. It would be a primary duty of workers of this type to popularise and spread, through educational work, sound knowledge about diet based on scientific research. The Conference further stressed the necessity for close collaboration between nutrition research institutes and agricultural and other departments which are necessarily concerned with food supply. A machinery must be developed to make it possible for the findings of nutrition workers to be translated into practical agricultural procedures which may lead to the better adjustment of agriculture to the dietary requirements of the population.

The problem of rice-milling was given considerable attention by the Conference and renewed emphasis is placed on the role played in the nutrition of the rice-eating populations by the degree of milling of this cereal. The difficulties in popularising amongst rural populations the use of under-milled rice are thoroughly recognised, but proper education in this matter may in time bring about a change of attitude. The attention of Governments is drawn to the spread of mechanical rice-mills in rural areas, and a strong recommendation is made that Governments should undertake complete studies of the whole rice problem. If the National Nutrition Committees referred to above are created, the study of the rice problem should undoubtedly be, in most countries, the first one undertaken.

An opportunity for further advance in the study of nutrition in the East is to be found in the recommendation that the report of the technical commission of this Conference be submitted to the Technical Commission on Nutrition of the League of Nations, and that the Health Organisation of the League should take the necessary steps to bring into closer contact its Technical Commission on Nutrition with the workers on the same problems scattered throughout Eastern countries.

Need for action based on co-ordinated research is stressed in the General Recommendations and the Technical Report reproduced in Chapter IV of the present volume.

* * *

The significance of *malaria* in the Eastern countries has been stressed by this Conference. It cannot be repeated too often that this disease kills more people and leads to greater physical, social and economic difficulties than any other. Malaria in badly infected areas forms a considerable barrier to the development of other welfare activities and oftentimes must be checked before other types of work become possible. This disease affords an excellent example of the need for co-ordination of Government departments. The campaign against malaria involves those concerned with agriculture, education, finance, forestry, irrigation and public works, and thus affords an excellent opportunity for demonstrations in rural reconstruction. It cannot be expected that all rural regions will be able to finance anti-malaria work, and aid from central funds may be a necessity if the disease is to be controlled. The importance of the so-called naturalistic control of malaria-carrying mosquitoes is a particularly important item in the opinion of the malaria experts at this Conference. The Health Committee of the League of Nations has itself already emphasised this point.

That engineering, housing, and public works activities, if not properly controlled, can give rise to much man-made malaria is unfortunately true, and the necessity for co-operation between those charged with malaria control and engineering or housing projects is an essential point which is emphasised. The cost involved in correcting malaria mosquito-breeding areas created by man is disproportionately greater than the initial changes

required in the original plans, if any. Certain types of engineering work should not be begun until the health authorities have had the opportunity to study the plans and to suggest such alterations which might eliminate the possibility of the engineering work producing mosquito-breeding areas. Unfortunately, there are too many examples of malaria being introduced into areas where it did not formerly exist, as a result of a lack of co-operation of the type mentioned above.

The relationship between malnutrition and the importance and severity of malaria is again noted.

While malaria control work must comprise programmes looking towards the ultimate disappearance of the disease, which is the final hope of public health workers in this field, there remains, however, a very urgent problem which must not be neglected. This is the appalling mortality caused by malaria at the present time in many countries of the East. *A great majority of the victims could be saved, apart from epidemic outbreaks, if it were possible to supply them with a few doses of quinine in time.* Furthermore, this treatment would in many cases suffice to enable the patients to resume their normal life and work, so that the economic havoc caused by the disease would, in many instances, be materially lessened. The Governments should take the responsibility of supplying treatment to the malarious sick, and of giving such treatment, not only in times of epidemics, but also under ordinary conditions. Totaquina and cinchona febrifuge are satisfactory for this purpose of saving life and reducing distress and, furthermore, they have the advantage of being cheaper than quinine.

The report of the Preparatory Committee of this Conference, in commenting on malaria, made the following statement, which is so significant that it will bear repeating :

“ One thing certain—and the Pan-African Conference in 1935 strongly emphasised the point—and that is that, unless the economic and cultural level of the rural populations can be raised, there can be no hope of employing curative or preventive measures with any degree of success. Malaria is a health and social problem ; it must be attacked simultaneously from both these angles ”.

The malariologists of the Conference have outlined a significant list of recommendations for malaria control in the East. This includes : (1) the creation of pre- and post-graduate courses in malaria prevention for engineers ; (2) a plan of studies of the problem bearing upon the control of rural malaria in regions where the standard methods are too expensive for the rural population. These studies should lead to the elaboration of the techniques of naturalistic control, which might be applicable under prevalent rural conditions and which would be within the economic possibilities of the populations concerned.

In order to bring the Malaria Commission of the League of Nations into closer contact with the malariologists of the East, it is suggested that an annual round table conference be convened at Singapore, at which members of the Malaria Commission of the League might participate. A course of instruction for engineers such as has already been referred to might also be held at Singapore.

* * *

That *tuberculosis* is one of the heavy scourges in Eastern countries is well recognised, although at the present time there is an almost complete lack of accurate data concerning the extent and severity of the disease in rural areas. The importance of carrying out preliminary surveys and sample tuberculin tests in the country is advocated. The financial limitations of the Eastern countries necessarily make it important that an anti-tuberculosis programme should be simple and adapted to local conditions. The beginning of such work must necessarily be modest and the gradual establishment of a network of rural dispensaries would appear to be advisable. The adoption of a programme looking towards the establishment of sanatoria, in the Western sense, would not seem to be applicable, but simpler institutions are suggested. A few sanatoria fully equipped might be desirable, but they would be primarily used for the training of doctors and auxiliary personnel in tuberculosis work. Advanced cases of tuberculosis frequently occupy the beds in public hospitals and provision should be made for the creation of less expensive institutions where this type of case could be comfortably but economically taken care of.

Anti-tuberculosis campaigns are relatively a novelty in the East. The different countries should endeavour to draw up plans which could be usefully interchanged and discussed by their public health representatives at the annual meeting of the Advisory Council of the Eastern Bureau of the League, at Singapore.

Experience has demonstrated that, in addition to any specific programme against tuberculosis, all steps which tend to improve the general standards of living and hygiene are followed by a definite decrease in the tuberculosis morbidity and mortality. Consequently, the fight against this important disease is assisted by any and all steps that have to do with betterment of the living conditions of the people. Thorough studies of the influence of nutrition as related to tuberculosis are indispensable.

* * *

The problem of *pneumonia* remains a serious one in Eastern countries, and it is only recently that very much attention has been paid to it. No general plan of campaign has been elaborated and it is suggested that such a plan should be entrusted to a body of experts who are particularly familiar with tropical conditions. This should be undertaken by the Eastern Bureau of the League.

* * *

Yaws, which is considered as an essentially rural disease, has economic and social aspects owing to the incapacity which it causes when not properly treated. The Conference believes that there is no conclusive evidence to show that this disease has ever been completely eradicated by the curative measures so far available. Intensification of treatment might result in the elimination of the disease and this would imply concentrated work in selected areas on a carefully controlled experimental basis. The difficulties of an experiment of this kind are considerable and involve the necessity of persuading people to accept treatment and also the difficulty of finding funds to meet the heavy cost of the arsenical preparations.

Ankylostomiasis has received much attention in Eastern countries. The main basis for prophylaxis remains the prevention of soil infestation and Governments should assist financially

and by all other means the buildings of proper latrines as the only permanent method of control. No new methods of control are advocated by the Conference, but special attention is drawn to the influence of diet on this disease.

* * *

With regard to *leprosy*, the Conference feels that, while there still exist many lacunæ in our knowledge of this disease, methods found applicable in its control in many countries should be used wherever possible.

Lepers, considered to be contagious, may be isolated in private homes, in huts outside the villages or better still in colonies. Supervision and simple treatment should be instituted, an occupation supplied and adequate nutrition guaranteed. Such colonies should, if possible, be made self-supporting.

Lepers should in every instance be taken care of within reasonable distance of their homes.

Until we have a more definite point of attack against this disease, the Conference urges Governments and private organisations to supply financial assistance to enable research work to be continued particularly with regard to the problems of its transmission.

* * *

As regards *plague*, the Conference referred to the Advisory Council of the League of Nations Eastern Bureau, for consideration and action, two proposals : One concerning the control of land and rail traffic so as to prevent the spread of infection ; and the second relative to an exchange between Governments of information and the best designs for rat-proofing rural houses and cottages.

The Conference further suggested that an interchange of information in regard to technique and results of vaccination against plague with non-virulent live vaccine as well as with the dead vaccine should be effected by the institutes concerned.

* * *

In connection with the care of cases of *mental diseases*, the Conference is of the opinion that acute mental cases must no

longer be accommodated even temporarily in institutions where there is no proper medical care. In no circumstances shall such cases be placed in prisons. Governments have the responsibility of caring for acute mental cases which represent a danger to the community. There should therefore be provided and financed by the Government a sufficient number of institutions so as to provide immediate accommodation, with adequate medical attendance for all acute cases. It is obvious that, under the existing conditions in Eastern countries, chronic and non-dangerous cases cannot occupy institutional beds which are needed for acute cases, but should be discharged as soon as their condition permits. Mental asylums can usefully be largely replaced by admission stations. Those mental cases which are no longer a danger to the community can either be sent home, placed in charge of families in neighbouring villages, or in colonies. Occupational therapy naturally being an important part of the treatment of mental cases the work in colonies will usually be horticultural or agricultural, and in this way the colonies may in time become self-supporting. The financing of colonies should be a charge against the local communities. This policy attempts to create a very simple means of handling mental cases which is efficacious.

While it is not possible at present to have an adequate number of trained psychiatrists, it would be necessary that the ordinary medical student receives a more thorough training in psychiatry and occupational therapy so that, if called upon, he would be prepared to take charge of the mental cases in the institutions suggested. The policy advocated for the care of the mentally defective, with regard to the creation of colonies, is not dissimilar to that suggested for lepers. It is anticipated that both lepers and mental patients may be made to support themselves and that when discharged and sent back to their villages, they will be able to resume their place and work.

* * *

The demand and need for *trained personnel* is a *sine qua non* for success in rural work. The lack of properly trained people is retarding development in all directions.

This applies in all countries to personnel from the highest experts to the lowest auxiliaries. It is felt that there should be no compromise in the training of the qualified men and women in medicine and that every country should maintain the highest standards commensurate with its resources and level of general education.

Preventive and social medicine should permeate the entire programme of medical education. What is true for the medical and public health education applies with equal force to other activities that have to do with rural work. The success of rural reconstruction efforts is dependent on the presence of properly trained people. The Conference has pointed out the necessity for much of this training being of a practical character. The provision of facilities for such training should be made.

No less important is the training of auxiliary personnel. Details partially with regard to the auxiliary personnel needed in the medical and public health services concerning this will be found in Chapter I.

In the last analysis, this type of personnel is the connecting link between the rural inhabitant and the medical man and the same principle applies to other branches of rural service.

* * *

On the preceding pages, an attempt has been made to touch briefly on some of the major points brought out by the discussions at the Conference; they are particularly designed to show that the rural problems are of such a character that they demand the concerted planning and action of groups of technical persons whose fields of activity have, in the past, been too frequently considered as separate and distinct. The opening of public health work in rural areas can often be used as the entering wedge for the development of a broader programme embracing education, economics, sociology, engineering and agriculture. The importance of the recommendations made by the Conference will be apparent in Chapters I to V containing the body of the report adopted. Sir Mirza Ismail, the Leader of the Indian delegation, has recommended that a second Rural Hygiene Conference for Eastern countries be held five years hence, in the belief that, if conferences were convened periodically, progress achieved in

various countries would be examined and further suggestions added in the light of experience gained in the interval.

The gravity and complexity of the problem involving rural populations make it incumbent, in the opinion of the Conference, on the highest Governmental authorities to take cognisance of the magnitude and urgency of the matters considered, and on Governments to assist the advancement of suitable programmes for rural improvement and to make available the requisite appropriations. The welfare of many of the Eastern countries is at stake if the rural populations are allowed to live at levels so low that they are incompatible with recent and healthy living.

That great progress has been made in many regions in the past several years is evident from the documentation presented by all the delegations, but the magnitude of the task remaining clearly emerges from the reports and recommendations adopted by the Conference.

tace, etc. Much time was occupied during the meetings in describing problems which concern local conditions, but suggestions for their solution were not numerous. A definite tone of conservatism prevailed in all discussions.

In organising rural health services, there is a tendency to take as a pattern some central organisation and plant it upon an area, whereas "decentralisation" of medical and hygiene services should be preceded by a study of local conditions, because successful rural health work must be based upon the cooperation of the people at the periphery. Methods of reaching the people and securing their cooperation vary very much in the different countries, but few of them make pure hygiene attractive, and this is the reason why leaders of health activities still make but slow progress.

The methods of reaching the rural population with curative and preventive activities present some of the most difficult problems brought forward at this Conference. Some of the Rapporteurs believe that curative activities should precede health activities; some that the two should be carried out concurrently; while others believe that the siting of clinics, dispensaries and hospitals and the effective use of these institutions can best be secured by giving priority to hygiene. The people should be led, not driven, and it is the task of the health worker to make hygienic as well as curative work attractive.

Emphasis should be laid not so much on centres from which the people are reached as on securing the co-operation of the village people and inducing them to go to those centres. In addition to the general activities of a public health organisation which should reach the entire population of a country, intensive activities of the personnel should be carried out, not only in centres and hospitals, but especially in the homes in order to secure the confidence of the people. The work must be conducted intensively and progressively in small defined areas, and relaxed only when the intelligent co-operation of the people living in a given area has been effectively secured. Co-operation stimulates activity and initiative.

Local conditions determine the type of organisation for both curative and health activities. In some countries, economic conditions have allowed separate organisations (for curative

and health activities) to be maintained, while in others it is not so. In countries where the curative and health activities are carried out by the same personnel, the risk of over-emphasising curative work must be carefully avoided.

It is difficult to separate the preventive from the curative side, but, if no attempt is made to do so and the workers have not had special training in hygiene, the tendency is to concentrate upon the more spectacular curative aspect and to let prevention fade into the background of the health picture.

In some reports, unfavourable economic conditions were quoted as reasons for failure to bring preventive or hygiene activities to the homes of the people, although in these same reports proposals were made that large systems of hospitals and dispensaries for curative activities should be organised. This inequality of development in curative and preventive activities prevails in many countries and the leaders of health activities find it difficult to convince Governments that the resulting situation is unsound. In this connection, accurate statistics can often become a useful weapon in the hands of the health worker.

Other reports suggested that, in some areas, the mentality of the population, owing to lack of progress and education, has not attained a level at which the value of health and preventive measures can be appreciated. The answer to this is that it is the task of the leaders of preventive activities to find suitable methods of addressing their appeal to the people and of making them appreciate the real value of preventive as opposed to curative medicine.

It is exceptional to find an individual in whom preventive and curative work can be combined. Where it is economically possible, the personnel of curative and hygiene activities should be separated, particularly as regards the village workers, who should be concerned with one type of work only. A capable physician or surgeon will ordinarily be so busy with his own duties that it is unfair and unreasonable to expect him to have the time for supervising the health work in his area. This is a strong argument in favour of placing whole-time health officers in charge of preventive work in rural areas. There must, however, be the closest possible co-operation between both sides.

The importance of vital statistics was emphasised in many reports. Accurate registration of births and deaths has been a mark toward which Eastern countries have been advancing for many years, but there are many difficulties still to be overcome. In any case, accurate morbidity statistics as well as mortality rates are required by the health worker. That information regarding morbidity is so scanty and difficult to obtain is a serious defect in nearly all of our present systems.

Those who plan to conduct hygiene work should know that, not only the subordinate personnel, but also the people of the area to be served must realise the difference between treatment and prevention. The people must understand that medical care, carried out by the personnel of hospitals and dispensaries helps them during the attacks of disease, but that the adoption of hygienic habits and healthful ways of living will help them to avoid many diseases and in many ways will improve their health.

Unless the personnel has received special training in hygiene and public health, it is only to be expected that curative work will be stressed, because its results are more easily and more rapidly attainable and more spectacular than prevention.

In some countries, the instruction in theoretical and practical hygiene and public health has been developed and the time devoted to these subjects in medical courses has been increased. Local conditions influence the training of personnel, but most countries are striving to improve the type of training given to medical and auxiliary personnel. Training in hygiene for medical personnel should include both theory and practice. Practical exercises in hygiene—i.e., the actual carrying-out of practical work—is as necessary in teaching hygiene as it is in teaching any other branch of medicine.

Many official medical and health departments seem to have difficulty in securing and keeping competent personnel, but this is largely a question of economics. Governments would be well advised to take full cognisance of the fact that cheap personnel leads to inefficiency, a lower standard of public health and costly reconstruction. Security of tenure for a health officer is an essential factor in enabling him to discharge his duties fearlessly and efficiently. Many reports refer to the disinclination among medical men to practice in rural areas.

Reference was made to the fact that the establishment of a medical or hospital service without a properly organised health service does not raise the standard of general health. It seems a very important principle that, wherever possible, hygiene work should precede curative work in order to obtain a more efficient use of dispensaries and hospitals and make more permanent the benefits of curative activities.

There was general agreement that personnel whose whole-time official duties are concerned with hygiene should not be conceded the right of private practice, but that due account of this fact should be taken in fixing the scale of their emoluments. Ability to carry out hygiene work successfully is largely an inborn talent and not only an attainment of education, and only the candidate who possesses this talent can be trained in technique and developed into a good worker. This applies to medical as well as auxiliary personnel.

Most of the speakers wished to emphasise the fact that improperly trained personnel cannot secure the confidence of the rural people without a definite technique acquired only by a thorough training in methods and procedure. The personal character of workers in all grades is also a matter of vital importance. Tact and patience are cardinal virtues in a health worker.

The training of midwives varies very greatly and, while in some countries it has been developed to a very high level, in others midwives receive only very short and perfunctory instruction. The use of untrained village midwives has been resorted to in some places during the transitional period. By teaching these women hygiene and non-interference, they can be made to serve a useful purpose without lowering the general standard of training. It is not always possible to ignore the village midwife, and it is often advisable to obtain her co-operation.

In some of the countries in which separate organisations for curative and preventive activities have been established, the co-operation of the personnel of the two organisations is excellent. This is of the greatest importance in avoiding overlapping of activities and in making the people understand that, while the one organisation helps them when they are ill, the other attempts to prevent illness and the spread of disease. Another important

principle brought out by the reports is that, in unitary systems in which the people learn the rules of hygiene and the dangers of spreading disease by contact, they should not be told to bring their healthy babies for examination to rural dispensaries where they come in contact with diseased people. The dual system avoids such conflict and, by proper use of separate entrances or separate buildings, this problem can be solved under the single system.

Organisations, whether for curative or preventive or combined activities, are more successful in securing the co-operation of the people and in securing permanent results if they are supported, at least in part, by local funds.

It was generally believed that decentralisation, or in better terms, the organisation of services on the basis that the people must learn to do all that they possibly can do for themselves, stimulates interest and initiative and leads to financial support of the activities by the people.

The organisation most suitable for reaching the population of a rural area is so dependent upon local circumstances that no specific type can be recommended for all countries, but during the Conference it was repeatedly emphasised by various speakers and reporters that preventive medicine brings such high returns upon the investment that it is much less expensive than curative work.

Although in some reports a definite percentage of the budget was allotted to health work, the percentage of the budget which should be appropriated for health work in each country varies in accordance with many different local conditions. The comparison of *per capita* costs is of practical value only in comparing data of places in which all conditions are similar. It was suggested that a percentage of the entire budget might express more accurately than *per capita* cost, to those not familiar with local conditions, a country's appreciation of health and curative work.

RESOLUTIONS.

1. *In Eastern countries more than anywhere else, preventive medicine is the cheapest means of improving the health conditions of the population in the rural areas, and it is along preventive lines that the effort should be principally directed.*

2. The system suitable for a given area may be that in which curative and preventive work are combined in one organisation, or that in which the two are carried out by separate organisations. Where economic conditions have allowed the adoption of the latter system, care should be taken that neither organisation should develop disproportionately to the other and that, where this disproportion exists, it should be corrected.

Where the former system has been adopted and the same personnel are responsible for both curative and preventive work, it is important that the preventive work should not be neglected. The time and effort which auxiliary personnel devote to curative and preventive work respectively should be determined by the superior staff.

3. As ultimately the preventive and curative work must be organised on a basis of accurate knowledge of the diseases and disabilities in an area, the importance of collecting accurate vital statistics cannot be over-emphasised. Our knowledge of morbidity in wide rural areas is very insufficient and it is therefore essential that every effort should be made to increase and improve it

4. It is absolutely necessary to bring medical and health services as near to the population as possible, but the decentralisation of activities should be guided and supervised by a central body in order to maintain efficiency and ensure a uniform policy.

5. While it is believed that decentralised preventive effort brings, comparatively, the greatest benefit to the health of the rural population at relatively the smallest cost, the means of applying this principle must necessarily vary with different local conditions and resources. No single type of organisation can be recommended for general adoption, but it is essential that, whatever the means may be, they should be applied with sufficient thoroughness to make the beneficial effect of preventive work clear to the rural population and that the area of operations should be defined accordingly. The likelihood of attaining results which are permanent is increased if the size of the field of operation is determined in accordance with the capacity of the staff.

Progress will depend on gaining the confidence of the people by demonstrating to them the benefits of preventive work, so that they will voluntarily take a share in the work by contributing to it in money or in labour.

A preliminary study of local conditions and requirements in the villages themselves should serve as a basis upon which details of the local services can be organised.

The kind of organisation employed for curative and preventive work by different countries has been described in detail in the respective national reports.

6. *As regards the question of the training of medical men, it has happened in many Eastern countries, as elsewhere, that medical education has evolved from a simple beginning to a modern Western standard. This historical process of evolution should be accelerated as much as possible.*

7. *The conference considers that, commensurately with its resources and its level of general education, every country should, in the sphere of medical education, attain the highest scientific level of theoretical and practical training, which should include facilities and opportunities for research. The spirit of preventive and social medicine should permeate more and more the whole programme of medical studies.*

8. *The Conference emphasises the importance of adequately training a large body of auxiliary personnel in order that the connecting link between the rural inhabitant and the medical men may be as efficient as possible.*

It also considers that the following views expressed in the report of the Preparatory Committee should be accepted as sound and followed as closely as possible—viz., that :

(a) *Their training should be as simple and practical as possible ;*

(b) *Care should be taken to ensure that their training does not make them lose touch with the people ;*

(c) *Remuneration should be adjusted to the economic conditions prevailing in the country districts ;*

(d) *They should not take up their practice at too early an age ;*

(e) *More importance should be attached to character (sense of duty, self-reliance) than to superficial erudition ;*

and the Conference would add :

(f) That instruction at least in hygiene of traditional or indigenous midwives during a transitional period may be required in some regions.

9. Emphasis is laid on the necessity for ensuring that all members of the auxiliary staff receive adequate training in hygiene and preventive medicine. The composition of the auxiliary staff relative to the kind of work they are called upon to do will vary in different areas.

10. At present, it is not possible to state what should be the per capita expenditure or the percentage of the general budget which should be allocated to medical and health services.

11. It is essential that all Governments be convinced of the importance of public health and be prepared to finance it liberally. They must be imbued with the view that public health expenditure is a wise and profitable investment of public funds, and should adopt a more generous policy in this respect.

12. It is essential that all Governments should realise that, while difficult to express in terms of money, the economic loss caused throughout the Far East by ill-health is a vital factor in determining the ultimate welfare of a country. No administration claiming to have the well-being of its people at heart can afford to overlook this.

13. Funds may be either central or local. It is advisable that the principle of local support be inculcated whenever possible and that the proportion contributed by local bodies should gradually increase. But to meet cases where local bodies with the responsibility for public health have not the means fully to finance it, the Central Health Department must provide annually in its budget adequate funds to supplement the deficiency, so that the necessary services may be supplied under proper supervision.

14. Approved voluntary agencies and associations should be encouraged to contribute to health activities.

15. It is essential to the proper functioning of a health service that the emoluments offered be fully adequate so that the right type of man with proper training may be attracted and retained, and enabled to devote his full time to the service.

16. *It is recommended that Administrations, when considering budgets for health purposes, bear in mind the following points:*

(a) *The financial saving and the economic advantages which result from employing the local people of the country and from using local materials, wherever practicable, in construction and maintenance of works in rural areas ;*

(b) *The value in times of financial prosperity of forming a reserve fund to be set aside for health and medical services in times of economic depression so that the necessary continuity of work may be safeguarded.*

* * *

In addition to its programme, the Conference has also had under consideration a proposal for a survey or surveys of the various factors affecting the health situation, to be carried out in a representative area or areas in various countries, in accordance with the scheme outlined in the following Appendix.

The Conference is of opinion that such surveys would be of great value in throwing light on the working of the various agencies whose activities directly or indirectly affect health, and in determining the amount expended out of family budgets on all aspects of health.

The Conference recommends that Governments be requested to consider the possibility of participating in the near future in surveys of the kind contemplated.

Appendix.

SURVEY OF HEALTH CONDITIONS.

SUGGESTIONS REGARDING FACTORS TO BE INVESTIGATED.

1. *Size, topography and climatic conditions of the area to be surveyed.*

2. *Population.*

(a) *Total number of inhabitants ;*

(b) *Density of population and manner of distribution (e.g., circumscribed villages or widespread communities).*

(c) *composition—homogeneous—of one race and religion with similar customs, or mixed.*

3. *Communications.* Accessibility of centres of population, large or small.

4. *Economic conditions.* Land tenure, system of ownership of movable property; family income and expenditure, covering not only costs of medical treatment and remedies of all kinds, but outlay on other items such as taxes, food, clothing, housing, heating, etc., and expenditure on social and religious customs on the occurrence of festivals, births, marriage and deaths.

5. *Endemic and epidemic diseases, their nature and prevalence, and any ascertained effects upon the condition of the population*

6. *Agencies whose work affects the health of the area.*

(a) Enumeration of every agency, official or unofficial which is directly connected with medical care and the prevention of disease.¹

(b) Similarly an enumeration of agencies not necessarily curative or preventive, but indirectly related to health—e.g., agricultural departments, educational departments, co-operative societies, credit systems, missionary organisations, etc.¹

(c) A study of the work and activities and all such agencies, and particularly of the methods adopted to apply curative and preventive medicine.

(d) A special study of the expenditure of all such agencies, and the cost per head of population of the services provided and the extent to which the population contributes directly towards it.

(e) The flexibility of the medical and health organisation and its adaptability to varying conditions.

(f) The results obtained by the means and methods employed. To what extent has the practice of sound methods of personal environmental hygiene been established and to what extent is the demand for medical treatment being met.

7. *Methods and means whereby the bulk of population obtain treatment when ill* and amount spent from the families' budget in this connection

Of these various data, some proportion at least which will vary according to circumstances, will be obtainable from existing documentary records.

Others, however, and in particular the study of agencies referred to in 6 (c) will necessitate a special field survey, the general method of which is indicated below :

A. *Delimitation of area.* In each country, a limited number of areas should be selected, each of which should be representative of a particular set of conditions. No indication as to size can be given; they should, however, be sufficiently large for the figures to be significant.

¹ These should include any urban institutions which provide facilities for the rural population under investigation.

B Staff. The question of the special staff is one which the Conference must leave to judgment of Governments.

C Procedure. The first stage in such an undertaking would seem to be the preparation by the Governments concerned of a draft scheme for the areas selected. To assist Governments in the work, the Health Organisation would collect and distribute suitable documentary material.

In order to ensure the uniformity which is essential if the data are to be subsequently comparable, the Health Organisation of the League of Nations would maintain contact with the investigating countries throughout.

Arrangements might be made before the work is started for an exchange of draft plans, through the medium of the Eastern Bureau, and for a discussion between the investigators from the different countries.

Similar meetings might be arranged in the subsequent course of the work, and at its termination.

For this purpose, advantage may be taken of the sessions of the Advisory Council of the Eastern Bureau.

improvement can be effected in the condition of the villager if those who are primarily concerned with his welfare and with whom the initiative for action must chiefly lie—namely, the governments—adopt appropriate measures.

This report attempts to indicate to them the various measures which, in the opinion of the Conference, appear to be necessary for the achievement of the end in view.

In this report, the lines of development that may be followed can be indicated only in very brief and general terms and it must be left to each country to adopt all or some of the recommendations best suited to its conditions ; but the essential principles underlying the recommendations are, it is believed, applicable to all countries in the East. It has been said that rural hygiene involves the collaboration of “ representatives, of public assistance, health insurance, agricultural associations, the medical profession, and scientific agriculturists, architects, hygienists and engineers.” To these may be added educationists.

And even this seems to be only a beginning. Preventive medicine by its very nature involves the tracing and attacking of the causes of the evils which it seeks to prevent, and the tracing of these causes seems to lead the enquirer into every department or aspect of human life.

If, for instance, the question of infant mortality is considered, the problem of over-population immediately looms up. One of the primary causes of over-population is a low standard of life, and a low standard of living may be due to climate, to ignorance, to poverty, to land laws, to lack of security and other political considerations. If, on the other hand, the question of diet be considered, it will be found that bad diet may be due to poverty ; it may, however, equally be due to excessive wealth, and there are many other factors to consider. National and individual beliefs may lead to the conviction that a less nutritious food is more suitable than one that is in actual fact more nutritious.

In such cases, while scientific research is of great value, it is equally important that the scientific knowledge that is available should be conveyed to the masses by organised publicity—*e.g.*, by lectures and demonstrations (for example, at weekly fairs and market-places).

This is no doubt a slow and laborious process, but one which in the end will produce results. It is essential that, if rural work is to be effective, the various agencies engaged in that work—namely, the administrative departments and private organisations, if any—should not only co-operate amongst themselves, but that they should also secure an adequate measure of co-operation from the villager. Team work is an indispensable necessity in all reconstruction work.

It is felt that, whether in the matter of housing, diet, sanitary arrangements or treatment of disease, it is necessary to work through the people, and avoid, as far as possible, imposing systems from above.

In attempting to introduce hygienic principles into village life, the endeavour should, in all cases, be to improve the existing arrangements and not to introduce new and comparatively expensive arrangements from outside. In housing, what the villager needs in India, for instance, is space and privacy. An endeavour should be made, whilst using his own materials and processes, to combine them with a reasonable provision for ventilation, sanitation, etc. In most cases, in the beginning at any rate, what is needed is the improvement of existing practices rather than the introduction of entirely new measures.

Hostels and public institutions offer an admirable ground for teaching the use of nutritious foods against which there may be at present a popular prejudice. The use of highly milled rice should be discouraged. Encouragement should be given to the millets, to vegetables, such as amaranth, tomato, etc., and the local fruits, which can be cheaply grown but which at present are not consumed by the common people.

The teaching of health knowledge and health practice should be one of the major objects of education in all schools and colleges.

This is a matter of profound importance. It must be remembered that education may "unfit" as well as "fit" a man for life.

It is necessary to arouse in the villager a sanitary conscience, but there can be no such conscience in a people who have learned no sanitary principles in childhood. For this reason, and also for the purpose of using the available limited resources

to the best advantage, it is believed that the most fruitful efforts will be those directed to the rising generation, even if that involves some neglect of the present.

This does not, of course, mean that the adult villager should be completely neglected. On the contrary, all possible efforts should be made to induce him to take an interest in the affairs of his village, and this is best done, in the view of the Conference, by forming in each village or group of villages a body consisting of representatives of the village or villages, as the case may be, selected or nominated by the Government, with a chairman elected by themselves or nominated by the Government.

Such a body will enable the village to govern itself, and it will also form the centre of various activities in the village.

The following duties may be entrusted to the village committee :

- (1) The supply of water for domestic use ;
- (2) The cleansing of public roads, drains, tanks, wells, and other public places or works in the village ;
- (3) The construction and maintenance and repair of minor roads, drains and bridges ;
- (4) Sanitation, conservancy and the prevention and abatement of nuisances ;
- (5) The lighting of the village and the improvement of the amenities of rural life and generally making conditions in the village more attractive.

In addition to the village committee, it is suggested that there should be an organisation to supervise and control the work of the Village Committee, and to co-ordinate and supervise the work of the various agencies, Governmental and others, operating in the area.

Experience in India, Ceylon and elsewhere shows that health and rural work is productive of excellent results if it is carried on in an intensive way in limited areas. It is felt that, in rural reconstruction, the greatest attention must be paid to quality, not to quantity. Work over large areas should not be undertaken until experiments have demonstrated that such work has been successful and is worthy of being extended.

If work is carried on in this manner, it would serve at least three useful purposes.

First, it would supply the area with modern health, and other services, productive of the maximum results.

Secondly, the scheme would provide a model unit in which methods, personnel and budgets, could be worked out for the eventual establishment of similar services for other areas.

And, lastly, the scheme would provide a training-centre for the health department personnel, from the health officer and sanitary engineer down to sanitary inspectors, public health nurse, midwives and vaccinators.

Similarly with regard to the personnel of the other departments engaged in rural development and improvement activities. The main idea should be to disseminate useful information and to carry improved methods to the door of the agriculturist. Where, for instance, a demonstration farm does not exist, it should be possible for the department to carry out experiments and demonstrations on the land of the peasants themselves.

A further effective approach may be made towards the solution of the village problem by organising corporate action for mutual benefit. It was the custom in India—a custom which still fortunately exists in certain parts—for villagers to carry out certain duties without any remuneration. Free labour was their contribution for communal works. In this way, roads were made or repaired, the village was cleaned and pits filled up. If this custom could be revived or introduced where it does not exist, the amenities of village life could be vastly improved, for the villager himself is unable to pay for hired labour, and it is hardly likely that the Government can fully provide either the men or the finance for such works.

All people in the area should be induced to participate in the programme—the poorest and the more prosperous, all castes and creeds, men and women, adults and children—all sections helping and all being helped by it.

Wherever possible, Governments should avail themselves of the co-operation of non-official agencies which are working successfully on similar lines and should encourage these agencies.

The Conference is of opinion that a most desirable qualification for workers amongst rural people is a knowledge of the

people themselves, embracing a knowledge of their language, their habits and customs, and their culture.

A policy, as outlined above, executed with clear vision, resolute will, and sympathetic heart, seems most likely to realise our aspiration—the highest possible welfare of the millions of the people who live on the land.

RESOLUTIONS.

1. *The Conference strongly emphasises the importance and urgency of rural reconstruction as a primary responsibility of every Government.*

2. *The Conference is of the opinion that one of the first steps in rural reconstruction that each Government should undertake is the co-ordination of the activities of its various agencies, both in planning and execution, so that the Government services to the population may be integrated, comprehensive and effective.*

3. *In the opinion of this Conference, it is necessary that every village or group of villages, as the case may be, should have an organisation of its own—namely, a committee for conducting its affairs and promoting its welfare in all directions.*

4. *There should be an organisation of control—namely, a committee of management consisting of Government experts, representatives of villages and other non-officials—to advise village committees as to the programme to be undertaken and to see that the programme is carried out, due consideration being given to the psychology of the peasant.*

5. *The village committees may be entrusted with duties relating to:*

- (a) *Water supply ;*
- (b) *Sanitation, house improvement and village-planning ;*
- (c) *Construction and maintenance of village roads and waterways ;*
- (d) *Social and recreational activities including playgrounds ;*
- (e) *Education of adults, both men and women.*

6. *Every village or group of villages should have, as far as possible:*

- (a) *A health centre or unit ;*
- (b) *A school and library ;*
- (c) *Co-operative societies ;*
- (d) *Demonstrations of improved agricultural practices ,*
- (e) *Facilities for improved animal husbandry, including the provision of preventive veterinary services ;*
- (f) *Home gardens ;*
- (g) *Home industries.*

7. *The Conference calls the attention of the Governments to the success achieved by the establishment in strategic points of rural welfare centres with adequate extension facilities. The welfare centre experiments with methods of approach, introduces improvements, enables the experts to collaborate and affords facilities for the field training of workers.*

8. *The Conference realises that any success in rural reconstruction is dependent on the presence of properly trained personnel and that it is therefore necessary that adequate facilities should be provided for the formation of technical personnel needed in all branches of work. The selection and training of suitable personnel, both men and women, is all-important. The training must be of a practical nature, including actual participation in rural work*

9. *The Conference, realising the increasing importance of the role which must be played by women in rural reconstruction, urges that everything be done to ensure that women shall be given all opportunity to develop their activities in this important field.*

10. *The Conference desires to emphasise the important part to be played by the village school in the work of rural reconstruction. It is essential that rural schools have a curriculum of study specially suited to prepare their pupils for rural life, not only because of the obvious necessity for such training, but also because of the prestige that attaches to things taught in the school. This means that the teachers' training-colleges must give training to that end. The curriculum of rural schools should comprise reading, writing and arithmetic, health, physical training and games, agriculture and*

nature study, manual training (training in the use of tools and materials for boys, needlework and domestic science or housecraft for girls) and citizenship. Special emphasis should be given to health education.

11. *In the belief of this Conference, without land reform in many countries, rural reconstruction will not rest on a permanent basis ; serious consideration of this problem and the study of methods best adapted to local conditions is urgently recommended to Governments.*

12. *The Conference would request the League of Nations to make arrangements to collect and make available information regarding successful examples of rural reconstruction in various countries.*

To that end, the Conference suggests that the information be collected by a special group of persons who are closely engaged in such work. The group will visit various countries and make a special study of rural reconstruction centres. Their report should be published for general information.

Chapter III.

SANITATION AND SANITARY ENGINEERING.¹

PREFACE.

The application to rural areas of the solutions of the problems of sanitation and sanitary engineering found applicable to urban areas is limited by a number of factors such as expense, ignorance of the people and low standards of living. It is therefore necessary to evolve methods which combine reasonable efficiency with low cost and low maintenance.

Hitherto, in most countries, little attention has been paid to these problems in rural areas, and the Conference desires to emphasise that the development of sanitation in rural areas is a matter of primary importance in the countries represented at the Conference, whose peoples are to a large extent agricultural.

The idea that dwellers in rural areas are necessarily healthier than those in urban areas and so can be left to look after

¹ The Third Commission (Sanitation and Sanitary Engineering), presided over by Dr. R. D. FITZGERALD (Malaya), included —

Ceylon — Dr. CHELLAPPAH.

China — Mr. P. K. TAO.

Fiji and Western Pacific — Dr. LAMBLRT.

French Indo-China — Mr. KALESKI.

British India — Lieut-Colonel NICOL, Dr CHENOV, Dr PARTHASARATHI, Dr. D. N. ROY.

Japan — Dr. Y. MINAMIZAKI, Professor KOIZUMI (technical adviser).

Malaya — Dr. BOWYER.

Netherlands Indies — M. F. M. RAZOUX SCHULTZ, Dr. MERTENS, Professor DINGER (technical adviser), Professor PROPER (technical adviser), M. H. I. PRIVÉ (technical adviser).

Siam — M. KOLASASTRA.

This Commission appointed a Sub-Committee as follows .

Sub-Committee on Flies :

Chairman : Dr. MERTENS. Members : Professor DINGER, Dr. GALLIARD, Dr. HYDRICK, Professor KOIZUMI, Dr. MORIN, Lieut-Colonel NICOL, Dr. PARTHASARATHI, Dr. ROY, Dr. RUSSELL, Dr. SOESILO, Dr. U. TIN, Professor YAMAMOTO.

In rural areas where houses are too scattered or poverty prevents the establishment of a piped water supply, it is desirable that grants be made available and placed at the disposal of local administrations to enable the installation to be made to do so, as and when the financial position permits.

Where a good water supply cannot be installed, even with available funds, much might be done by the improvement of existing wells and the construction of new ones and by education of the people in methods preventing well-pollution.

In cases where no well, or one containing non-potable water exists, a properly constructed well should be provided where possible.

3. DISPOSAL OF HOUSE REFUSE AND OTHER WASTES.

The proper disposal of human excreta is of primary importance, because on it depends the control of hookworm disease and other worm diseases, typhoid fever, dysentery and cholera, all of which are prevalent in the East.

Taking into consideration the fact that the rural people cannot usually afford to construct expensive latrines of the water-carriage type, and the fact that the pail system with collection under supervision cannot be made available except under special circumstances, the rural population must rely on the use of one of the approved types of inexpensive latrines.

The bored-hole latrine, when it has been intelligently installed on suitable soil, has been found to be very satisfactory. A cement concrete or other suitable squatting-slab should be insisted upon. These can be produced in numbers quite cheaply.

In areas where a sanitary organisation is available, the pail system is recommended.

In several countries in the East, manure is a great necessity and certain types of latrines are being developed with the object of utilising night-soil as manure without its being a danger to health.

In many areas, it is found that the well and the latrine are sited too closely together, and this Conference recommends that action should be taken to prevent the pollution of rural wells in this way. Investigation will be necessary in various localities

to decide upon minimum requirements in respect of distance and direction between the well and the latrine.

It is recommended that composting may be considered for the disposal of night-soil and house refuse where the pail system is adopted.

The importance of the disposal of refuse and house wastes has not been overlooked, but, as the methods vary according to local circumstances, no general recommendations can be made.

4. FLY CONTROL.

The problem of flies in general, especially in countries in the Far East, is a matter of research.

At the present time, very little knowledge of the bionomics of flies, or their relation to diseases, etc., is available in countries in the East.

It is suggested that, as such research requires *highly technical knowledge*, workers ready to participate in these studies should communicate with the Health Section of the League of Nations Secretariat at Geneva, which will provide the requisite technical liaison for the investigation.

Though there is a possibility of preventing fly-breeding by composting, nevertheless there are reports showing that composting may be responsible for fly-breeding to some extent. Further investigation is considered necessary to improve the method of preparing compost in such a way as to obviate fly-breeding.

The same remark regarding investigation applies to many other methods of disposal of human and animal wastes.

RESOLUTIONS.

1. *The Conference recommends that Eastern Governments should each constitute committees for small-village planning in order to avoid "laissez faire" development, and that these same agencies should set up local standards dealing with details regarding siting, types of houses, building material, ventilation, lighting and heating, waste disposal and water supply. In*

particular, it is emphasised that the kitchen should not be inside the living part of the house and that cattle-sheds should be detached.

2. The Conference suggests that a good water supply should be provided in all rural areas.

The Conference further suggests that, when possible, grants from public funds should be made available to provide good water and that financial return on such schemes should not be a matter of primary consideration.

The Conference recommends that new water supplies delivered to rural areas should be of the same recognised standard of purity as those approved for delivery to large towns, no new pipe-line supply should be installed unless the purity of the water conforms to this standard.

Where the supply of water of the above-mentioned quality is not feasible, it is recommended that properly constructed wells with cover and pump should be provided where possible, existing wells should be improved, and requirements to prevent contamination of wells should be promulgated.

3. (a) The Conference is of the opinion that the proper disposal of human excreta is of the utmost importance to the health of the rural population.

(b) In those Eastern countries where the use of manure for agricultural purposes is of primary importance, human excreta and household refuse should be dealt with in a way suitable for placing the product on the land as manure.

(c) The question of the pollution of water in wells by pitlatrines is a matter that needs further investigation, and it is recommended that Eastern Governments should consider undertaking such investigations.

4. (a) The Conference recommends that more research work concerning flies should be undertaken, and suggests that it should be based on the lines indicated by the League of Nations document C.H. Hyg. rur. E.H.15(I) reproduced below (Appendix).

(b) The Conference recommends that the programme of study should also include investigations into the alleged efficacy of dung- and refuse-stacking and of composting as a means for the prevention of the breeding of flies.

Appendix.

THE FLY PROBLEM IN THE EAST.

RESEARCH PROGRAMME SUBMITTED BY PROFESSOR B. A. R. GATER
(SINGAPORE).

Owing to the different climatic and zoogeographical zones in which the various Eastern countries are situated, the fly problem in the East is much more complex than in Europe.

A study of the reports by Health and Sanitary Authorities in the East reveals that the assumption is often made that the problem is the same as in Europe; whereas it is uncertain in many cases if the true *Musca domestica* exists in the country in question, or even if flies of the "domestica" group are responsible for the carriage of disease. Moreover, the association of flies with disease has often been assumed rather than demonstrated.

In Eastern countries, the problem is better termed the "fly problem" than the "house-fly problem", since conditions are often such that flies which do not ordinarily frequent houses may be of importance as vectors of human disease. Thus, even in urban areas, a large percentage of the human population feeds outdoors, and food eaten in houses is frequently prepared outside the house.

The habits of Eastern flies may differ to a great extent from those of their European representatives. For example, in many parts of the East, accumulations of manure are not necessary for fly-breeding; the principal source of flies may be the isolated droppings of various animals, and the medium suitable for larval development may be much moister than in Europe.

At the present time, very little accurate knowledge of the bionomics of flies or of their relation to disease is available in the East. It is therefore suggested that work in the various countries might be arranged along the following lines:

A. Investigations.

I. *Systematic.* Precise systematic studies, in each country, of the flies associated with:

- (i) 1. Human food and excrement.
2. Human wounds and sores.
3. Human sweat and eyes.
- (ii) Domestic animals (hæmatophagous and blood-sucking species).

Note. — (a) It might be convenient to study these associations under (i) urban, and (ii) rural conditions.

(b) The flies may conveniently be grouped as follows :

1. Family MUSCIDÆ, with the sub-families MUSCINÆ (including the Tribes Muscini and Anthomyini), CALLIPHORINÆ and SARCOPHAGINÆ
2. Other Calyptera.
3. *Archiptera*, etc

II. *Disease.* Studies on the importance of these flies in so far as they are :

1. Vectors of intestinal or ophthalmic disease
2. Injurious or annoying
3. Causes of myiasis.
4. Of possible utility for larval therapy

Note. — (a) Actual proof of the isolation of pathogenic organisms from wild flies is required. Co-operation by the Departments of Bacteriology and Protozoology should be arranged

(b) A study of the incidence of intestinal or ophthalmic disease in a natural or artificial "fly free" area should yield valuable results

III. *Biology.* Studies along the following general lines :

1. Interchange between the various countries of living material with a view to cross-breeding experiments to settle questions of specific identity, and to facilitate comparative studies

Note. — (a) Do *Musca domestica* and *M. vicina* interbreed ?

(b) Do *Musca domestica* breed and persist in strictly tropical countries ?

2. Studies on the breeding-habits and food requirements in the various stages, of the dangerous species

Note. — Special observations on exceptional breeding-material and its local importance

3. Studies on the dispersal of the dangerous species from their breeding-places
4. Studies on the behaviour and taxis of adults and larvae
5. Studies on the general ecology of all stages in the life-history of the dangerous species

Note. — To ensure uniformity, it is suggested that in these studies some standard arrangement of headings should be adopted (e.g., as in Chapman's "Animal Ecology").

IV. *Control* Trials of various methods, under local conditions, in (i) urban, and (ii) rural areas, along the following general lines :

1. The prevention of oviposition.
2. The destruction of larvæ or of larval food.
3. The destruction of adults.
4. The prevention of access by adult flies to undesirable material (*e.g.*, food, excrement, etc.) under local conditions.

B. *Education.*

Methods and means for the education of the population in the dangers of flies and their control.

C. *Co-ordination.*

The co-ordination of the investigations undertaken in the various countries, and the publication¹ of the results obtained, by the Health Section of the League of Nations.

Chapter IV.

NUTRITION.¹

PREFACE.

It is now generally recognised that nutrition is an important branch of public health activity. During recent years, the Health Organisation of the League of Nations has given great attention to nutrition, and public health authorities and departments in Europe and elsewhere have been increasingly active in this field. The inclusion of this subject as a prominent item on the agenda of a Conference of Far-Eastern Countries on Rural Hygiene was not, therefore, a striking innovation; it was, indeed, peculiarly appropriate and necessary for a number of reasons.

Much of the basic work on which the modern science of nutrition is built was carried out in the East in countries represented at the Conference. The vigorous attack on beriberi which took place during the thirty years preceding the Great War

¹ The Fourth Commission (Nutrition), presided over by M. VINAY (French Indo-China), included :

British North Borneo — Dr. TREGARTHEN.

Burma — Colonel SODHI.

China — Dr. HOU HSIANG-CHUAN.

Fiji and Western Pacific — Dr. LAMBERT.

Hong-Kong — Dr. VALENTINE.

British India — Dr. W. R. AYKROYD, Mr. C. V. SANE, Dr. Spencer HATCH.

French Indo-China — M. AUTRET, M. OUDOT (technical adviser).

Japan — Professor SAIKI, Professor YAMAMOTO (technical adviser).

Malaya — Captain WHITWORTH.

Netherlands Indies — Dr. VAN VEEN, Professor DONATH, Dr. KWA TJOAN SROE (technical adviser), Dr. KOOLHAAS (technical adviser), Dr. Siegenbeek VAN HEUKELOM (technical adviser), Dr. LAMPE (technical adviser), Dr. MERTENS (technical adviser).

Siam — Dr. VIDHIVEJJ.

This Commission appointed a Technical Group as follows :

Technical Group on Nutrition.

Members : Dr. AYKROYD, Professor DONATH, Professor SAIKI, Dr. HOU HSIANG-CHUAN, Dr. VAN VEEN.

is of exceptional interest and importance in the history of medical science. Distinguished biochemists in Europe and America who played a part in the discovery of the vitamins owed a great deal to clinical and field workers in the East, whose object was to find practical solutions of formidable public health problems. Further, an historical interest is attached not only to discoveries about the relation between diet and disease, but also to attempts, often successful, to give these discoveries practical effect in the field of preventive and curative medicine. The combating of disease by the alteration and improvement of diet is no new idea in the East.

There can be no doubt that nutrition is of greater importance to the public health worker in the East than in the West, though its importance in Western countries should not be minimised. A large number of investigations on man and laboratory animals have shown that certain combinations of foodstuffs ensure a higher degree of health and physical development than others. The most superficial examination of food habits in the East indicates that the diets of the great mass of the population are far from being of the type which the nutrition worker to-day regards as most desirable; to put it more strongly, they are thoroughly deficient in terms of such dietary standards as those put forward by the Technical Commission on Nutrition of the Health Organisation of the League of Nations in the Report "The Physiological Bases of Nutrition". Apart from such considerations, the thesis that nutrition is a subject of vital interest in the East is upheld by the daily practical experience of physicians and public health workers, and by numerous scientific observations and experiments. The subject was therefore of major importance among the items on the agenda.

The recommendations include sections dealing with the establishment of national nutrition committees, the training and employment of nutrition workers, and the desirability of liaison between nutrition and agriculture. The important rice problem is considered and various recommendations put forward.

Suggestions are made regarding collaboration between nutrition workers in the East and the League of Nations Technical Commission on Nutrition.

In the technical report, stress is laid on the importance of further work on various subjects, including the nutritive value of foodstuffs, dietary surveys and the study of "state of nutrition". The question of dietary standards was examined with great care, and note was taken of the work of the Technical Commission on Nutrition of the League of Nations in this connection. It was, however, felt to be difficult at this stage to define satisfactory diet standards which would be of practical use in the East; when further data have been accumulated, it may be possible to attack the problem successfully. The technical report accordingly confines itself to drawing attention to a number of standards put forward in various countries, and a series of recommendations about diet which may be of value as a guide in practical nutrition work are put forward.

In general, the need for action based on co-ordinated research is stressed in the recommendations and the technical report.

RECOMMENDATIONS.

1. *The Conference emphasises the importance of diet in relation to health problems in the East. The available evidence suggests that under-nourishment and malnutrition is widespread and that much impairment of physical development and general health, low vitality and actual disease result from insufficient and improper diet. While the problem is difficult to attack, being largely bound up with economic conditions, the Conference nevertheless feels that there are possibilities of improvement and progress in many directions. It therefore hopes that Governments will increasingly support work in this field.*

2. *The establishment in each country of National Nutrition Committees is recommended. These may suitably include, in addition to nutrition workers, representatives of various departments of State, including public health, medical, educational, agricultural, animal husbandry and fisheries departments. The task of the Committees would be to advise their Governments on matters pertaining to the food and diet of the people.*

3. *The Conference considers that a central institute or laboratory concerned with nutrition research and its practical applications should exist in all Eastern countries.*

4. The Conference recommends the training and employment of selected public health workers to act as specialists in the field of practical nutrition. Such workers may suitably be attached to central and provincial health departments. They can carry out field investigations, engage in propaganda work, organise school-feeding schemes, advise regarding the dietary aspects of maternity and child-welfare work, regulate diet in Government and charitable institutions, such as boarding-schools, mental homes, leper asylums and so on, and in general assist in the practical application of nutritional science.

5. The Conference recommends that close collaboration should be established between nutrition research institutes and agricultural and other departments concerned with food supply.

The nutrition worker can consult the agricultural expert about the practical possibilities of the changes and improvements in diet he recommends; conversely, the agricultural expert can obtain guidance from the former regarding desirable improvements in diet which may be furthered by crop-planning, better agricultural techniques, selective breeding methods, improved manuring, composting, etc.

6. The Conference emphasises the fact that the degree of milling to which rice is subjected is of vital importance in connection with the problem of nutrition throughout the East. In many countries, the poorer classes consume foods other than rice in small quantities, and it is very difficult, for economic reasons, to increase the amount of supplementary foods in the diet; in such circumstances, the nutritive value of the main article of food, which is influenced by the degree of milling, becomes of great significance. The Conference recommends that only under-milled rice should be supplied in Government institutions. Efforts to popularise the use of under-milled rice by education and propaganda should be increased. It deplores the increasing tendency of urban and rural populations in the East to consume highly milled rice. It strongly recommends that Governments should make a thorough investigation of the nutritional, commercial, economic and psychological aspects of the problem, attention being given to the possibility of checking the spread of mechanical rice mills in rural areas, with a view to conserving the healthy habit of consuming homepounded rice, and

to means of making under-milled rice easily available everywhere for those who wish to purchase it. This problem might be among the first to be considered by the National Nutrition Committees recommended in paragraph 2.¹

7. The Conference notes the technical report which is appended and recommends that the report should be submitted to Governments for comment. The latter may suitably refer the report to the National Nutrition Committees or to some other appropriate body. The technical report contains a number of suggestions about nutrition research. The Conference hopes that Governments will inform the Health Organisation regarding institutions which would co-operate in carrying out investigations of the type outlined. It suggests that detailed reports on the progress of studies should from time to time be sent to the Health Organisation, if necessary in the original language.

It is further recommended that the technical report on nutrition should be submitted to the League of Nations Technical Commission on Nutrition, and that the Health Organisation should undertake to establish contact between that Technical Commission and nutrition workers in the East.

TECHNICAL REPORT ON NUTRITION.¹

I. THE NUTRITIVE VALUE OF FOODSTUFFS.

In various countries, a considerable amount of work has already been carried out on the nutritive value of foodstuffs. The importance of extending and completing investigations of this nature is pointed out. The study of foodstuffs should include determinations of protein, fat, carbohydrate, calories, fibre, vitamin A, carotene, the B group of vitamins, vitamin C, vitamin D, total-ash, calcium, phosphorus and iron.

In order to determine the nutritive value of diets as actually consumed, the investigation of foodstuffs in the raw state should be supplemented by investigations of the effect of methods of

¹ The preparation of this report was entrusted to a small technical group.

preparation and cooking. Further research on the biological value of protein in foodstuffs peculiar to the East is desirable, and the investigation of the "availability" of food factors, particularly iron, contained in various foods is also a necessary part of any survey of food values.

It is desirable that the existing data should be made easily available for practical nutrition work. The publication by Health Departments of suitable pamphlets describing the nutritive value of foodstuffs is recommended; these should be issued free or at low cost to ensure wide distribution. Such pamphlets may suitably include sections on the planning of diets and provide specimen menus and schedules.

While it is desirable that each country should undertake the investigation of indigenous foodstuffs, there is a considerable similarity in the types of foodstuffs consumed throughout the East. Accordingly, the results of investigations in one country may be of use in other countries in which extensive research in this field has not yet been undertaken. It is recommended that the question of publishing a comprehensive volume on the nutritive value of foodstuffs, including all data at present available throughout the East, should be studied. This task may be entrusted to an editorial committee nominated by the League of Nations Health Organisation. It is suggested that the Health Organisation should be responsible for the publication of a volume of the kind indicated.

2. DIET SURVEYS.

In order to develop public health nutrition work, to study the relation between diet, physique, general health and the geographical incidence of various diseases, it is essential to have detailed knowledge about the diets consumed by various sections of the population. "General impressions" are inadequate; properly conducted surveys will often reveal that such impressions are erroneous. In a number of countries, detailed family diet surveys in urban and rural areas have already been carried out but the Commission feels that further investigations of this nature are required. It accordingly recommends that a series of diet surveys, with special reference to rural areas, should

be undertaken on uniform lines in the various countries. With regard to the technique of dietary surveys attention may be drawn to the *Aide-mémoire* on this question presented to the meeting of representatives of National Nutrition Committees.¹

In general, a commonsense method of sampling should be adopted in selecting areas and families for purposes of investigation. The number of families to be studied and the period of enquiry must depend on local circumstances. A small number of families may be surveyed for a prolonged period—*e.g.*, a year—or a larger number for shorter periods of a few weeks at various seasons. In the latter case, a minimum period of three weeks is recommended. If a representative sample is chosen, a very good idea of dietary habits in a large area may be obtained by the study of a comparatively small number of families—say thirty.

It is essential that food consumed between meals should be taken into account. Festivals and periods of fasting should be given due consideration in organising surveys designed to assess the value of diets consumed throughout the year.

Experience has shown that to collect reliable data it is usually necessary to obtain the collaboration of workers in close touch with the population and on familiar terms with them—*e.g.*, sanitary inspectors, health visitors, rural reconstruction groups, etc.

The Evaluation of Data obtained in Diet Surveys.

Diets should be described both in terms of foodstuffs actually consumed and in terms of intake of the various food factors—protein, fat, minerals, etc.

To compare food intake in families of varying age and sex composition, it is recommended that for the present the conventional scale drawn up by the League of Nations Rome Conference in 1932 should be employed. This scale is as follows :

¹ Geneva, March 1937, R.C.N./Alim./5.

Age		Co-efficient		
		Male	Both Sexes	Female
0 to	2		0.2	
2 and	3		0.3	
4	5		0.4	
6	7		0.5	
8	9		0.6	
10	11		0.7	
12	13		0.8	
14 to	50	1.0		0.8
Over	60		0.8	

No opinion is expressed on the appropriateness of this scale for nutrition research in the East. The scale has, however, already been extensively used in India, Ceylon, the Netherlands Indies and China. Its use will enable results of investigations in different places to be compared.

It is hoped that the Expert Commission of the League of Nations, which will meet in Geneva in November 1937, will provide guidance in the matter of consumption units. The use of a similar scale to assess caloric, protein and mineral intake is illogical, since the requirements of children, relative to those of adults, are greater in the case of protein and minerals. To establish a more suitable scale of consumption co-efficients for the East, further investigations of basal metabolism and food consumption in the various age and sex groups are necessary.

Attention is drawn to the desirability of collecting economic data regarding groups studied in diet surveys. Diet is largely dependent on economic conditions, and the value of diet surveys is enhanced by the collection of information about the economic environ of the families studied. Conversely, economic enquiries may profitably be extended to include the study of diet with the advice and guidance of nutrition workers. In this connection, reference may be made to the importance of studying the relation between income and the cost of "minimum adequate diets", "well-balanced diets", etc., as drawn up by nutrition workers in the various countries.

3. DIETARY STANDARDS.

It is at present difficult to define standards which will be useful and applicable throughout the East, in the manner followed by the Technical Nutrition Committee of the League of Nations in the report "The Physiological Bases of Nutrition". It is, however, advisable that in each country standards and schedules, based on the information available, should be drawn up for use in practical nutrition. The establishment of standards which may be described as "satisfactory" or "adequate", which are in conformity with existing dietary habits and economic realities, should be aimed at. In this connection, attention may be drawn to recommendations made in various countries which are given in the Appendix.

4. DIET AND "STATE OF NUTRITION".

In section 2, the importance of collecting information about dietary habits was emphasised and methods of carrying out surveys outlined. The study of "state of nutrition" is closely related and complementary to the investigation of diet. By correlating diet and "state of nutrition", the value of diets can be assessed and light thrown on the question of dietary requirements.

It is therefore recommended that the relation between "state of nutrition" and diet should be studied, particular emphasis being laid on the value of carrying out such investigations in conjunction with diet surveys. The following lines of enquiry are recommended :

(a) Studies of basal metabolism.

(b) Investigation of the "state of nutrition" of population groups—*e.g.*, school-children, by various means which may include the following :

General physical examination.

Records of average height and weight and other anthropometric data in the various age and sex groups.

The incidence of milder forms of food deficiency disease—*e.g.*, night blindness, xerophthalmia, stomatitis and phrynoderma.

The incidence of dental caries and malocclusion.

Hæmoglobin estimations.

Laboratory tests designed to detect deficiency of various vitamins—*e.g.*, by blood and urinary examinations, may be recommended as circumstances permit.

(c) The study of the effect on "state of nutrition" of improving the diet of selected groups. In carrying out such investigations in schools, etc., attention may be given to general alertness and ability, the incidence of minor ailments, absences due to sickness, etc., which may be influenced by changes in diet.

(d) Study of the "state of nutrition" and diet of well-to-do groups above the general average of the population as regards physique and health, for purposes of comparison with other groups.

5. RECOMMENDATIONS ABOUT DIET.

While an exact definition of dietary standards and requirements cannot be attempted, certain general recommendations may be useful as a guide to public health workers and others concerned with nutrition problems in practice. These recommendations deal with a number of questions considered to be of importance, but are not intended to be comprehensive.

(a) The inclusion of some *animal protein*¹ in the diet is desirable (and perhaps essential from the standpoint of optimum nutrition), and is strongly to be recommended in the case of growing children and of expectant and nursing mothers.

(b) *Under-milled rice* is of greater nutritive value than highly milled rice in respect of vitamin B₁ and other factors including protein and mineral salts. Highly-milled parboiled

¹ This term includes the proteins in milk.

rice, unlike highly-milled raw rice, may contain vitamin B₁ in considerable quantities. The repeated washing of rice before consumption may result in the removal of a considerable proportion of the vitamin B₁ and other factors originally present. *Whole wheat* and *millet* are in various respects superior to rice, particularly highly-milled rice. A diet based on a combination of milled rice with another cereal is to be preferred to a diet based on milled rice alone. The question of rice milling is referred to in the recommendations, paragraph 6.

(c) *Fish* is a good supplement to diets largely composed of rice,¹ supplying good protein and sometimes vitamin A. *Small fish* which are entirely consumed are a rich source of calcium and other inorganic elements.

(d) The composition of *eggs*, which yield good protein, most of the vitamins, together with calcium, phosphorus and iron, makes this food a valuable supplement to the rice-eaters' diet.

(e) *Milk*² is rich in the factors in which rice is deficient and is therefore of exceptional value as an addition to diets based on rice. In many parts of the East, fresh whole milk is unobtainable. The nutritive value of *skimmed-milk* powder from which liquid milk may be reconstituted by the addition of water, and other forms of milk from which the fat has been removed—*e.g.*, butter milk, is emphasised. Skimmed milk contains all the factors present in whole milk except vitamin A and fat, and is a rich source of protein, calcium and certain factors in the vitamin B complex. Unless properly supplemented—*e.g.*, by cod-liver oil—skimmed milk is unsuited to form the *sole* food of infants. It can, however, with advantage be included in the diet of children past infancy.

¹ In a number of recommendations, the expressions "rice-eaters' diet", "diets based on rice", etc., are used, since rice is the most important cereal in Eastern countries. In general, however, the same recommendations are applicable when the diet is based on certain other cereals—*e.g.*, millet.

² The word as used here implies preparations of milk which contain all the nutritive elements present in whole milk.

(f) *Pulses* are rich in vitamin B₁ and contain other factors belonging to the B group of vitamins ; they are also a good source of vegetable protein. In small quantities—*e.g.*, 50 to 100 grammes daily—they form a valuable supplement to a diet mainly composed of rice.

(g) *Soya bean* contains a high percentage of protein and fat, and preparations of soya bean are an important dietary ingredient in certain Eastern countries. While soya bean is a valuable food, it does not make good all the deficiencies of diets based on rice. Soya bean "milk" has little in common with mammalian milk beyond a white colour. Suitably supplemented—*e.g.*, by egg yolk, malted sugar and mineral salts—soya bean "milk" may be useful in infant feeding.

(h) The high nutritive value of *green leafy vegetables* is strongly emphasised. Green leafy vegetables are rich in carotene, the precursor of vitamin A, vitamin C and certain other vitamins and mineral salts, notably calcium. (The problem of the "availability" of iron in leafy vegetables requires further investigation.) Since animal fats containing vitamin A are scarce in Eastern countries, leafy vegetables are of special importance as a source of carotene (pro-vitamin A). They are of higher value when fresh¹ than when dry and stale.

(i) Among fruits and non-leafy vegetables, the following are rich in pro-vitamin A : mangoes, pappaya, tomatoes, oranges, yellow and red sweet potatoes and carrots. In general, fruits and vegetables are good sources of vitamin C.

(j) Attention may be drawn to the possibility of making use of *red-palm oil* as a source of pro-vitamin A in certain countries. Crude commercial red-palm oil is as rich in vitamin A activity as an average sample of cod-liver oil. The problem of introducing red-palm oil into the diet in palatable form requires further investigation.

(k) The classes in the community which are particularly likely to suffer if their diet is defective are infants and growing

¹ The term "fresh" does not here imply "uncooked".

children and expectant and nursing mothers and special attention should be given to the nutrition of these classes.

(l) The attention of public health and educational departments is drawn to the value of providing suitable meals and various supplementary foods—*e.g.*, milk—for day-school-children. It considers that school-feeding schemes, carried out with the co-operation of nutrition workers, are among the most important means of combating malnutrition and improving the health and development of growing children.

Appendices.

A. DIETARY REQUIREMENTS IN CHINA.

PART I. — GENERAL STATEMENT.

(Quoted from a report on "Diet and Health in China" submitted to the Conference, by Dr. Hou Hsiang-chuan, delegate from China)

A complete diet, as we now know, should have all the necessary dietary essentials, carbohydrate, fat, protein, inorganic salts, vitamins, water and crude fibre, each in its correct amount and proper proportion. The average amounts of the various constituents required by an average adult European or American have recently been laid down by a Technical Commission of the Health Organisation of the League of Nations.¹ For an average Chinese adult, owing to the smaller body weight, the amounts of protein, fat and carbohydrate may be correspondingly reduced provided sufficient quantity of protein is of animal origin. But, since the protein generally consumed is almost entirely of vegetable origin, the quantity should actually be greater than that recommended by the League experts.

As to the protective foods, owing to the shortage of dairy products and for economic reasons, the dietaries recommended by the League of Nations are not applicable to the Chinese masses at the present. It is proposed that a minimum diet, satisfactory as regards the various food factors, may be made up with the various local foods as suggested in Part II, Table 1.² The data in the table are based upon analyses made locally. The rather high protein requirement is proposed because, as

¹ Report on the Physiological Bases of Nutrition, *Quart. Bull. Health Org.*, 1936.5. 391.

² Foods of similar type not mentioned in the various categories may be substituted with slight modification in the amount. It is recommended that as many different kinds of foods as possible should be included in the diet in order to make sure that all the necessary food factors are obtained.

mentioned above, the diet is mainly cereal. When more animal protein is available, the total daily protein requirement may be reduced. Green leafy vegetables, since they are the cheapest source of protective foods generally available to the masses, are recommended in large amount, and this is not larger than what is actually consumed by the natives of a few places in the country. Several cereals are recommended in the table in view of the better utilisation of their constituents when a mixture is taken. Salted or pickled vegetables are included because they form an important dish in most Chinese families. With regard to fats, it is desirable that some animal fat be taken, though peanut oil is generally consumed. Rice polishings and soya-bean cakes, which have never been used as human food except in time of famine, are desirable additions to the diet since these are valuable cheap food for human beings. This diet which, in general terms, consists mainly of potato, soya-bean and rice, millet or wheat, supplemented with plenty of green vegetables, some rice polishings, occasionally an egg or some meat, is fairly satisfactory and calculated to bring about a decrease in the deficiency diseases common among the masses.

With the coming industrialisation of the country, the diets of the factory workers need more attention, since the indoor life with its probable "unhygienic" conditions calls for a better-nourished state. The foods should be in a more easily digested and assimilable form than those of the farmers or the open-air labourers. Further, a complete or balanced diet is particularly necessary for people during the growing period and women during pregnancy and nursing, since during these periods there is a greater demand for the various dietary constituents for a full development of the young and proper functioning of the mother. A more liberal recommendation therefore is made for these groups of people.

PART II. — MINIMUM DIETARIES AND IMPROVED DIETS (CHINA).

(Taken from a report of a Committee on Nutrition¹ appointed by the Council on Public Health.)

The dietaries suggested in the inset opposite for adults and children are to be regarded as supplying the *minimum* requirement. Although the position of calcium in nutrition in China is not yet thoroughly investigated, figures for calcium are included in the table inset as a suggestion of the great importance of this element.

¹ The members of the Committee consisted of :

Wu Hsien — Chairman.

Wm. H. Adolph.

S. F. Huang (Mrs.)

H. W. Swen.

Hou Hsiang-chuan — Secretary.

For those who can afford it, milk and other animal foods may be taken to replace part of the cereal. As an illustration, the diet for a child of 30 kg. may be greatly improved by introducing milk and meat, fish or glandular tissues (Table 2).

Table 2. — *Improved Diet for a Child of 30 kg., 8-10 years (China).*

Class of food	Wt	Cal.	Pr.	Ca
<i>Protective foods.</i>				
Green leafy vegetables	300	45	4	0.30
Tuber	200	142	2	
Legume (Tou-fu)	200	133	17	
Meat	660	150	12	0.32
Eggs	80(2)	120	10	0.04
Milk	700	460	22	0.84
<i>Supplementary foods.</i>				
Cereals		750	21	0.07
Fat and oils	—	—	—	—
Total		1,800	88	1.57

For infants, the best diet is breast milk, provided the mother who provides it is properly nourished. Failing breast milk, cow's milk with appropriate modification should be used. Milk should always be heated to the boiling-point to obviate the risk of infection. "Soya-bean milk" with various supplements has been used with some success, but artificial preparations for infant-feeding in China are still in the experimental stage.

Beginning with the second month (a) the infant should receive fresh fruit juice (orange juice) or vegetable (cabbage) juice and (b) when sunshine is not abundant, a small daily ration of cod-liver oil increasing gradually to 6 grams daily.

Beginning with the seventh month, the infant should receive one soft-boiled egg yolk (if tolerated) or puree of green vegetables or carrots. Beginning also with the seventh month, the infant may receive cereal gruel and mashed potato.

B. DIETARY REQUIREMENTS IN INDIA.¹

CALORIES.

In drawing up a new diet schedule, or in assessing the value of an existing schedule, it is essential to know whether enough food is being provided. It might be thought that it is easy to discover whether, let us say, a group of labourers or the boys in a boarding-school are getting enough to eat; if their food is insufficient, they will be hungry and complain about it. But experience has shown that human beings can adapt themselves, at a low level of vitality and with their powers impaired, to an insufficient ration, and scarcely realise that they are underfed. The nutrition worker, in setting up standards of food requirements, ignores the remarkable faculty of the body to adapt itself to semi-starvation. His standard of food intake implies full satisfaction, enough to enable human beings to lead an energetic life at a reasonably high level of working capacity.

An Expert Commission of the League of Nations² has drawn up the following statement about energy requirements :

(a) *An adult, male or female, living an ordinary everyday life in a temperate climate and not engaged in manual work is taken as the basis on which the needs of other age-groups are reckoned. An allowance of 2,400 calories net³ per day is considered adequate to meet the requirements of such an individual.*

(b) *The following supplements for muscular activity should be added to the basic requirements in (a) :*

Light work : up to 75 calories per hour of work.

Moderate work : up to 75 to 150 calories per hour of work.

Hard work : up to 150 to 300 calories per hour of work.

Very hard work : up to 300 calories and upwards per hour of work.

India is mainly an agricultural country and the "average Indian man" is engaged in a manual occupation. There are justifiable reasons for reducing "basic" calorie requirements in a warm country, in which the diet consumed is largely vegetarian, below the League of Nations standards. Let us suppose that an Indian male of sedentary occupation

¹ Extracts from *Health Bulletin No. 23*. "The Nutritive Value of Indian Foods and the Planning of Satisfactory Diets", prepared by the Nutrition Research Laboratories, Coonoor, and published by the Manager of Publications, Delhi. The recommendations are in terms of the tables of food values provided in the *Bulletin*.

² Report on the Physiological Bases of Nutrition, *Quart. Bull. Health Org.*, 1936, 5, 391.

³ The term "net calories" refers to the amount of energy available from the food actually assimilated.

requires some 2,150 calories, a figure 10% below that of the League Commission. Six hours "moderate" work, at the lowest reckoning, will involve an increase of requirements to roughly 2,600. We shall not be very far out if we reckon the minimum calorie needs of an average Indian, engaged in ordinary easy-going agricultural or coolie work, as 2,500 to 2,600 calories per diem. Those who perform heavy manual work probably require about 2,800 to 3,000 calories per day, as is indicated by the League Commission's figures.

The following scale of co-efficients and calorie requirements is put forward as sufficiently accurate for practical nutrition work in India

Scale of Average Calorie Requirements		
	Co-efficient	Calories Required
Adult male (over 14)	1.0	2,600
Adult female (over 14)	0.8	2,080
Child 12 and 13 years	0.8	2,080
Child 10 and 11 years	0.7	1,820
Child 8 and 9 years	0.6	1,560
Child 6 and 7 years	0.5	1,300
Child 4 and 5 years	0.4	1,040
Child 2 and 3 years	0.3	780
Child 0 to 2 years.	0.2	520

This scale is a somewhat arbitrary one.

Physique, habits of life and other factors are so variable in different areas that no scale of energy requirements and co-efficients could be entirely suitable for application throughout the country. A somewhat higher scale of requirements would perhaps be more appropriate for North India. It is possible that the proposed scale puts the requirements of an adult woman at too high a figure. During pregnancy and lactation, however, the needs of a woman may equal or exceed those of a man.

PROTEIN.

Growing children require, per unit of body weight, more protein than adults. The following scale of protein requirements is suggested as a rough guide for practical nutrition work :

Protein Requirements		
Age and Sex	Co efficient	Grammes per day
Man 18 to 60	1.00	65
Woman 18 to 60	0.85	55
Boy 10 to 17	1.20	80
Girl 10 to 17	1.10	70
Child 6 to 9	0.90	60
Child 2 to 6	0.60 to 0.80	40-50

The scale fall short of the ideal as dictated by modern physiology and may often with advantage be exceeded. It is nevertheless excessive as far as Indians concerned, in the sense that economic circumstances and dietary habits often prevent its attainment.

The Commission of the League of Nations referred to reported as follows:

"During growth, pregnancy and lactation, some animal protein is essential, and in the growing period it should form a large proportion of the total protein."

We may recommend that this proportion should be at least one fifth. The best source of animal protein for growing children is milk, derived from the cow or other species.

FAT

Fat must be included in ordinary diets, but we have no exact knowledge of the quantity required. It is probably advisable that not less than 45-60 grammes (1½-2 oz.) should be consumed daily.

CALCIUM.

The usual text-book figures representing calcium requirements are 0.65 grammes daily for adults, and 1 gramme for children. These figures allow a high "margin of safety". Indian diets, particularly diets based on milled rice, may supply less than 0.20 grammes of calcium daily. This intake is too small. The diet of growing children should contain upwards of 0.60 grammes of calcium daily and that of pregnant and nursing women rather more.

IRON.

A well-balanced diet for a growing child or an adult should contain 20 mgs. of iron. This figure gives a "margin of safety". The iron present in certain foods is less "available"—i.e., less well assimilated—than the iron in others. A high percentage of the iron in pulses and meat, for example, is "available", but only a low percentage of the iron in vegetables. If, however, total iron intake from all foods present in the diet exceeds 20 mgs. per day, it is probable that sufficient iron will be assimilated.

VITAMIN A.

It is suggested that a well-balanced diet should contain a daily minimum of 3,000 international units. In Western countries, a large proportion of the total vitamin A activity of the diet is usually derived from vitamin A contained in animal foods. Animal foods rich in vitamin A

are, however, expensive foods, and in the East it will usually be found that the easiest and cheapest way of ensuring a sufficiency of vitamin A units is to increase intake of green leafy vegetables. For example, 3 ozs. (about 85 grammes) of amaranth leaves will supply more than 3,000 international units.

VITAMIN B₁.

The vitamin B₁ requirements of school-children and adults may be estimated at 300 international units per day. It is not difficult to ensure that a diet contains this quantity of the vitamin. If 4 ozs of unmilled cereal, 6 ozs of leafy and other vegetables and 2-3 ozs of pulses are consumed daily, it is probable that enough vitamin B₁ will be obtained, even if the rest of the diet is composed of milled rice

VITAMIN C.

A well-balanced diet for school-children and adults should contain some 30-50 mgs. of vitamin C per day.

A "WELL-BALANCED" DIET.

The following represents a well-balanced diet yielding 2,600 calories, corresponding to average adult daily requirements :

Rice	10 ozs (284 grammes)
Millet	5 " (142 ")
Milk	8 " (227 ")
Pulses	3 " (85 ")
Non-leafy vegetables	6 " (170 ")
Green leafy vegetables	4 " (113 ")
Fats and oils	2 " (57 ")
Fruits	2 " (57 ")

C. DIETARY REQUIREMENTS IN JAVA.

AN ADEQUATE DIET AS DESCRIBED IN THE REPORT OF THE NETHERLANDS
INDIES FOR THE INTER-GOVERNMENTAL CONFERENCE OF FAR EASTERN
COUNTRIES ON RURAL HYGIENE.

(Expressed in grammes.)

	Kotawinangoen Region	
	Per Capita	Per 50 kg. body-weight
Rice.	295.0	442.9
Maize	—	—
Glutinous rice (ketan)	3.0	4.5
Coconut	31.0	46.5
Coconut oil.	5.5	8.3
Palm sugar.	4.5	6.8
Cane sugar	0.6	1.0
Pulses	33.0	49.5
Of which tempé (prepared from soya-bean)	18.0	27.0
Tubers.	52.0	78.1
Fruits	59.0	88.6
Vegetables	55.0	82.6
Trasi (unsalted dried fish).	0.7	1.1
Meat	3.0	4.5
Eggs	0.1	0.2
Fresh fish	0.4	0.6
Salted and dried fish	0.5	0.8
Salt	9.0	13.5
Total calories consumed	1,600	2,402
Protein	40.2	60.0
of which — Meat proteins	0.5	0.7
Fish proteins.	0.3	0.4
Rice proteins	22.7	34.1
Soya proteins	6.7	10.1
Maize proteins	—	—
Fat	33.0	49.5
Carbohydrates	285.0	427.9

D. DIETARY REQUIREMENTS IN JAPAN

CALORIE AND PROTEIN REQUIREMENTS IN VARIOUS AGE AND SEX GROUPS.

Age	Male (Total)			Female (Total)		
	Coefficient	Calories	Protein grammes	Coefficient	Calories	Protein grammes
0-2	2	480	20	2	480	20
3-4	4	960	40	4	960	40
5-7	5	1200	50	5	1200	50
8-10	7	1680	70	6	1440	60
11-14	8	1920	80	8	1920	80
15-20	10	2400	100	9	2160	90
21-50	10	2400	80	8	1920	60
51-60	10	2400	60	7	1680	40
60-above	9	2160	45	6	1440	30

Standards published by the Director of the Nutrition Institute, Tokio, based on a large number of field and laboratory investigations and surveys. These standards have been widely used with satisfactory results.

Chapter V.

MEASURES FOR COMBATING CERTAIN DISEASES IN RURAL AREAS.¹

PREFACE.

The preparation of the Agenda of the first Intergovernmental Conference of Far-Eastern Countries on Rural Hygiene necessarily involved a process of selection—the selection, for consideration, of certain of the diseases which are of importance to rural communities of the Far East.

It was obviously out of the question to deal with all the diseases that might seem to have a claim to attention ; especially since only those which constitute a social scourge may be regarded as falling within the scope of the Conference. Even among these there are some of which further consideration would be superfluous since methods of prevention are well established.

¹ The Fifth Commission (Measures for combating Certain Diseases in Rural Districts), presided over by Professor DE LANGEN, included :

British North Borneo — Dr. TREGARTHEN.

Burma — Dr. U. TIN.

Ceylon — Dr. CHELLAPPAH.

China — Dr. C. Y. WU.

Fiji and Western Pacific — Dr. MCGUSTY ; Dr. LAMBERT.

Hong-Kong — Dr. VALENTINE.

British India — *Malaria* : Major MULLIGAN, Dr. P. F. RUSSELL, Dr. PARTHASARATHI. *Plague* : Dr. ROW, Dr. C. F. CHENYOY, Dr. M. RAHMAN. *Leprosy* : Dr. R. ROW, Lieut.-Col. CHATTERJEE, Mr. SPENCER HATCH. *Tuberculosis and Pneumonia* : Lieut.-Colonel NICOL, Dr. RAHMAN. *Ankylostomiasis* : Dr. PARTHASARATHI, Dr. CHENYOY.

French Indo-China — Dr. CHESNEAU, Dr. DOROLLE, M. KALESKI, Dr. GALLIARD, Dr. MORIN.

Japan — Professor KOIZUMI, Dr. MINANIZAKI (technical adviser), Dr. SHIMOJO (technical adviser).

Malaya — Dr. BOWYER.

Netherlands Indies — *Malaria* : Dr. OVERBEEK, Dr. SOESILO, Professor BRUG (technical adviser), Dr. W. MOOY (technical adviser). *Leprosy* : Dr. SITANALA, Dr. LAMPE, Professor VAN WULFTTEN, PALTHE, Dr. KWA TJOAN SIOE, Dr. SOESILO (technical adviser). *Tuberculosis and Pneumonia* : Professor Dr. SIEGENBEEK VAN HEUKELOM, Professor Dr. BONNE, Professor DINGER, (technical adviser), Dr. DE WOLFF (technical adviser). *Yaws and Ankylostomiasis* : Dr. KOUWENAAR, Professor DINGER, Professor BRUG (technical adviser). *Plague* : Dr. ROSIER, Dr. KIRSCHNER, Professor DINGER (technical adviser).

It should not be assumed that the diseases considered are necessarily those of greatest importance to all Eastern countries; an attempt has been made, however, to make a selection representative of various forms of ætiology and pathogenesis.

It should be pointed out that diseases which are recognised as being directly due to malnutrition and which are of the greatest importance in the Far East have not been dealt with in this Chapter.

There remained a number of diseases of which some are more or less the natural lot of rural districts, such as plague, ankylostomiasis and yaws, and others like leprosy, which have so far not been suppressed for lack of effective prophylaxis, while yet others, like tuberculosis and pneumonia, present special features when encountered among populations in the East and the tropics.

Philippines — Dr. MANALANG.

Siam — Dr. VIDHIVEJJ.

This Commission appointed a Technical Committee and five Technical Groups as follows :

Technical Committee on Malaria

Chairman : Dr. RUSSELL. Members Dr. MORIN, Major MULLIGAN, Dr. OVERBEEK, Dr. PAMPANA, Dr. SOESILO, Dr. U TIN

Technical Group on Leprosy

Chairman : Dr. ROW. Members Major BOZMAN, Dr. DOROLLE, Dr. LAMPE, Dr. MANALANG, Dr. SITANALA, Colonel SODHI, Dr. C Y WU

Technical Group on Plague :

Chairman : Dr. WU LIEN TEH. Members Dr. CHELLAPPAH, Dr. CHENYOY, Dr. KIRSCHNER, Dr. OTTEN, M. ROSIER, Dr. SRIVASTAVA, Dr. PHRA JAN VIDHIVEJJ, Dr. ROW

Technical Group on Tuberculosis and Pneumonia

Chairman : Professor SIEGENBECK VAN HEUKELOM. Members Professor BONNE, Lieut-Col CHATTERJEE, Dr. CHESNEAU, Dr. MORIN, Colonel SODHI

Technical Group on Ankylostomiasis and Yaws :

Chairman : Dr. KOUWENAAR. Members . Professor BONNE, Dr. CHESNEAU, Dr. CHELLAPPAH, Professor GALLIARD, Dr. LAMBERT, Dr. PARTHASARATHI.

Technical Group on Mental Diseases and Drug Addictions

Chairman : Prof. VAN WULFFTEN PALTHE. Members : Dr. DOROLLE, Dr. ELSHOUT, Dr. KWA TJOAN SIOE, Dr. SOESILO, Colonel SODHI, Dr. THEUNISSEN, Dr. WU LIEN TEH.

The question of mental diseases and the alternative of asylums or agricultural colonics was clearly also a matter for discussion.

Finally, the vast problem of malaria obviously called for special and separate attention.

In considering what general attitude to adopt in dealing with these questions, the Conference felt that it should avoid discussing their technical aspects on controversial lines, but should concentrate rather on framing practical recommendations for the guidance of Governments.

This was the principle followed throughout the discussions. As a result, it was found that the diseases chosen for consideration fell naturally into two groups :

The first group comprises malaria, yaws, plague, ankylostomiasis, leprosy and mental diseases.

In the case of these diseases, it appeared to the Conference that sufficient knowledge and practical experience had already been accumulated in the East to justify the formulation of concrete recommendations.

In the second group comprising tuberculosis, pneumonia, and plague, the Conference felt that this stage had not yet been reached. In the circumstances, it stressed the need for further investigation and recommended that Governments should draw up plans for the attack of the problems involved, and that such plans should be sent to the Eastern Bureau of the League of Nations at Singapore for communication to the other administrations concerned.

In the event of a further Conference being held at some future date (as would appear to be highly desirable), an opportunity will doubtless be afforded of considering other diseases which are perhaps of little less importance than those dealt with on the present occasion.

Malaria.

INTRODUCTION.

The following recommendations have been formulated after a series of discussions in which not only the members of the Technical Group took part but also, by invitation, a number of public health administrators, engineers, and others. The aim

has been not to report scientific debates or to summarise the present state of knowledge of malaria, but rather to attempt to indicate some practical lines of procedure as regards public policy in dealing with malaria in the rural portions of Far-Eastern countries. These recommendations, therefore, are not based solely on the limited experience of technical experts, but fully as much on the broader practical acquaintance with the subject which executive responsibilities give.

The recommendations must necessarily be somewhat general in character, for the countries of the Far East vary greatly, not only in political organisation and in medical and public health policies, but also in financial resources. It is believed that any attempt to standardise anti-malaria procedure for all Far-Eastern countries would be highly inadvisable. Each country must determine for itself, with the help of personnel specially trained in malariology, the most logical plan of campaign within its own borders, having due regard for general principles, for the funds and staff available, the invariably focal distribution of the disease, and the opportunities for enlisting local co-operative assistance.

RECOMMENDATIONS.

I. The Importance of Malaria.

Malaria kills more people and does more damage to physical, social and economic welfare in rural portions of Far-Eastern countries (especially in the tropics and sub-tropics) than any other disease. This has been once again emphasised in the preparatory national reports and by the testimony of leaders of delegations to this Conference. Yet malaria is insidious, and except in epidemic form, it does not manifest itself with dramatic power sufficient to attract attention and funds commensurate with its ability to destroy health and prosperity. This Conference desires to emphasise the outstanding importance of malaria, and to urge lay and health administrators so to formulate their budgets that the amount of money and energy devoted to the control of this disease will be in proportion to its paramount importance.

II. Administrative Policy as regards Malaria Control.

The Conference, in the first place, considers that the technical assistance of staff specially trained in malaria work is absolutely essential if an administrator is to deal successfully with malaria control. This consideration follows the general lines suggested by the League of Nations Malaria Commission as far back as 1924. Any malarious country which to-day has no health personnel, skilled in malaria technique must be regarded as an anachronism. But the Conference believes that responsibility for malaria control should rest squarely on the minister or other officer in charge of the public health policy of a country and not on the technical expert.

The Conference, secondly, recommends that, since malaria is a focal disease in any country—absent in some rural areas, lightly prevalent in others, and moderately or heavily endemic elsewhere—the structure of, and programme for, rural health organisation, including health units and health centres, should not be stereotyped, but flexible. In those areas where malaria is the outstanding social and health problem, the resources of the health administration, specially augmented where necessary, should be directed chiefly towards malaria control, even if this should entail the restriction of other public health activities, until malaria is no longer of major importance. As a rule, the physical debility and mental apathy of malaria-stricken peoples will not permit them to respond to a general public health programme, so that it is a logical procedure first to deal with malaria. On the other hand, where malaria is of minor importance, it may be dealt with adequately as part of an ordinary public health programme.

Thirdly, the Conference would like to emphasise the value of practical demonstrations of malaria control as a means of arousing the interest of lay (and even health) administrators. The lack of a good example of malaria control, well documented as regards statistics and costs, often explains official apathy and failure to appropriate funds for control programmes. The Conference recommends that, in countries where a malaria control-programme is poorly developed or is being projected for the first time, sufficient funds be allocated for at least five years to carry out a model project. This should include, not only the controlled area, but also an equally

carefully studied area nearby in which no control is carried out, so that a contrast may be available. Such a demonstration control project with its contrast area has very great propaganda value, much more than a score of surveys barren of practical results.

In the fourth place, the Conference emphasises the vital need for administrative co-operation between the health and other Government departments, such as Agriculture, Education, Finance, Forestry, Irrigation and Public Works. Further, the Conference recommends that, in the development of rural malaria control, the aid of such local bodies as co-operation societies, health leagues and rural improvement centres, should be enlisted and utilised to the fullest possible extent.

III. Cost of Malaria Control in Rural Tropics.

The Conference notes that, in many rural areas, the greatest obstacle in the way of malaria control is the fact that such measures as the use of oil, Paris green, or drainage, cost more money than the rural communities can raise. The Conference would point out carefully that it has been amply demonstrated that malaria control is to-day, as a rule, financially feasible in cities and large towns, communities of Government or industrial employees, military cantonments, constructional projects, colonisation camps and pilgrimage centres, and wherever agriculture is organised into sugar haciendas, coffee estates, tea gardens, rubber plantations, oil-palm, casuarina or coconut groves, and similar ventures. In such places, it is lack of organisation, not lack of money, which delays malaria control. Indeed, in many rural areas, deficiency in organisation, rather than in funds, is the real difficulty.

The Conference recommends that, in formulating programmes for the control of rural malaria, administrators pay due regard to the above distinctions and, further, that they give rural districts as much aid from central funds as possible, particularly when the legal rights pertaining to streams, tanks or other malariogenic waters are under their direct jurisdiction.

Secondly, the Conference recommends that, in order to reduce control costs for rural communities, every effort be made (a) to extend the free distribution of cinchona products, (b) to enlist

the aid of the people themselves in minor control methods, and (c) to explore cheaper methods of control which use time more than money. Persistence rather than perfection in control is required for rural areas.

IV. Naturalistic Methods of Malaria Control.

The epidemiology of malaria is intimately associated with the adjustments and responses of malaria-carrying mosquitoes to their environment. The natural factors which determine whether or not water is malariogenic are numerous and often complicated, since they are dependent upon physical, chemical and biological conditions. The deliberate manipulation by man of one or more of these natural factors so as to prevent mosquito-breeding, to destroy larvæ, or even to deviate adult mosquitoes from man to animals, has come to be known as Naturalistic Control, and the Conference wishes to draw special attention to the possibilities of reducing malaria in this way.

Peasants can be taught such minor naturalistic methods as herbage packing with green-cut vegetation; fostering natural enemies such as fish; removing sheltering vegetation; shading breeding-places by cultivating certain plants or using coconut palm leaves, or woven bamboo mats, where the dangerous mosquito requires sunlight; periodical sluicing of small streams to eliminate mosquito breeding. Other naturalistic methods—such as utilising natural tendencies of rivers to deposit silt, or to flood or flush; making fresh water salty or vice versa; changing water levels; agitating surface water; automatic sluicing of larger streams—these usually require engineering skill.

The Conference recognises that all of the above methods have been successfully applied in selected areas, and it urges that each country, not neglecting to use standard methods where feasible, investigate the possibilities of such cheap procedures. Up to the present, exact biochemical and microbiological observations have been so few that application of naturalistic methods has been largely empirical. The Conference emphasises the need for reflective enquiry, so that naturalistic malaria control may be based more on reason than on authority. In the opinion of the Conference, great hope is offered for the control of rural malaria in selected

areas by these naturalistic methods, which are relatively inexpensive and can suitably be carried out by the peasants themselves.

The Conference notes with satisfaction that the Health Committee of the League of Nations included in its plan of work for 1937-1939 the study of naturalistic methods of malaria control, a study which the Conference warmly recommends to workers in the East

V. The Effect of Construction Works on Rural Malaria.

Although in some Far-Eastern countries a fair degree of co-operation has been developed between health officers and engineers for the avoidance of malaria, yet the amount of engineer-made malaria in other countries is appalling. Specifically, the Conference calls attention to malaria due to improper siting and housing; indiscriminate aggregation of labourers; uncontrolled jungle clearing; excavations such as borrow-pits, brick-fields and quarry-pits; obstruction of natural drainage by road, railway and canal embankments with culverts too few and too high; impounding of water without regard to leakages, seepages and raised water-table levels; irrigation without drainage.

Co-operation with the health authorities would obviate many of these unfortunate occurrences at little or no additional cost. In other instances, the expenditure of such additional sums as would be necessary to avoid the production of malaria would be justifiable, because it is almost invariably found that the cost of remedial measures is disproportionately greater than the extra initial outlay required to prevent malaria.

The Conference recommends, first, that every effort be made by lay administrators to secure close co-operation between their engineers and health officers; secondly, that appropriate legislation be enacted to prevent the creation of malariogenic nuisances by engineering departments or contractors under their supervision; thirdly, that, in the budget of every constructional project in malarious places, there be an item for malaria control; and, fourthly, that engineers be instructed in the fundamental principles of anti-malaria sanitation before assuming executive responsibilities in the tropics. In the opinion of the Conference, this end would best be achieved by special pre- and post-graduate courses of instruction and by suitable pamphlets for subsequent guidance.

VI. Relationship between Rural Malaria and the Activities of the Peasants.

It is well known that the amount of peasant-made malaria in rural areas is considerable. Specifically, the Conference draws attention to malarigenous "wet cultivation" such as rice and sugar-cane, neglected side channels; leaky pumps; wells; uncontrolled jungle and mangrove clearance; various agricultural pits holding water; fish-ponds; mill-ponds; ruts; hoof prints; and buffalo-wallows; waste irrigation water; ill-kept drains. The Conference considers it important that attempts be made to develop agricultural technique which will tend to eliminate malaria-carrying mosquitoes and at the same time to improve crops. There is no evidence that the average peasant is interested, or can be aroused to sustained interest, in malaria control. He requires more tangible returns.

The Conference strongly recommends further research to the end that malaria control in rural areas, perhaps along naturalistic lines, may be interwoven eventually with agriculture, pisciculture and animal husbandry. The need for specially trained malarial agriculturists may perhaps be as great as for malarial engineers. Certainly, in rural areas there must be an attempt to fit malaria control methods to the needs, habits, capabilities, and resources of the peasants.

VII. Distribution of Anti-Malaria Drugs.

The Conference is in agreement that the first responsibility of the Government in any malaria campaign is to save from death and relieve from physical distress the malarious sick by making anti-malarial treatment readily available. It subscribes, therefore, to the opinions expressed by the Malaria Commission of the League of Nations in its second report (1927) that the treatment of the malarious sick is the first step in any malaria policy and that "wide distribution of quinine is a public duty which, whenever and wherever necessary, should be organised and paid for by the State".

The Conference is also in agreement that, during malaria epidemics, it is the responsibility of a central government to make free treatment available to all; that, in ordinary times, where

malaria is prevalent, free treatment should be provided for those who cannot pay. The Conference, further, is in agreement that the cinchona derivatives remain the drug of choice for mass distribution. While recognising the usefulness of the new synthetic drugs in controlled therapy, the Conference is of the opinion that they cannot yet safely be placed in the hands of rural populations in Far-Eastern countries. It wishes to call attention to the forthcoming report of the Malaria Commission of the League of Nations embodying the results of co-ordinated experiments with synthetic drugs on the treatment and prophylaxis of malaria in the field. This report was not available to the Conference.

The Conference recommends that every effort be made to widen the scope and cheapen the cost of mass distribution, especially of the less expensive totaquina and cinchona febrifuge. It realises that the distribution of anti-malaria drugs at present is not so much malaria control as an alleviation of acute distress with reduction of mortality. Experience in many countries shows that the people can be induced to take just sufficient treatment to suppress symptoms even when the drug is given free.

The Conference recommends that health departments enlist the aid of Governmental or other reliable agencies in distributing cinchona products. When a special staff of dispensers is organised, the cost of distribution becomes a serious item. It is also suggested that any special programme for mass distribution be organised without supplanting the normal function of dispensaries. In certain restricted areas there might be considerable propaganda value in limiting the free distribution of anti-malaria drugs to those whose blood smears contain plasmodia.

VIII. Need for Further Research.

The Conference would like to emphasise a few special questions on which further research is urgently required in connection with the control of rural malaria. In the first place, while the systematic classification of anophelines is on a sound basis, there is a serious lack of information as to the bionomics even of those species known to be dangerous malaria carriers. Success in developing cheaper methods of naturalistic control must depend on a much fuller knowledge of the habits and intimate habitats of anophelines.

This applies not only to antilarval measures, but also to such potentially useful methods of attacking adult mosquitoes as insecticidal spraying.

In the second place, a much more definite understanding of the relationship between malaria, malnutrition, famine and poverty is required, as well as further elucidation of the factors concerned in malarial immunity especially in so-called racial immunity.

In the third place, too little is known about the malaria parasite from the time it leaves the mosquito's proboscis until it appears in the peripheral blood. If this stage in the life history of plasmodia were known, it might be possible to accelerate research on the prevention of infection by drugs.

In the fourth place, a good deal more investigation is required to develop practical mosquito-nets for rural areas in the tropics, to forecast epidemics, and to make the use of zooprophylaxis practicable.

IX. Relation of Malaria Commission of the League of Nations to Far-Eastern Countries.

The Conference desires to emphasise the value of the International Course in Malariology held at Singapore under the auspices of the Health Organisation of the League of Nations.

It believes that only officers experienced in malaria work should, for preference, be sent to this course. It also believes that the Health Committee might consider the possibility of giving a concurrent course for anti-malaria engineers at the same time and place. It further suggests the possibility of having a week's round table conference each year in which members of the League Malaria Commission from the East might usefully take part, for the dual purpose of advising the malaria Commission on studies and problems in the East, and of comparing the conclusions of any investigations undertaken by, or through them, on behalf of the League.

The Conference welcomes the proposal, under the Health Committee's three-year plan, for the Malaria Commission to consider the advisability of holding, not earlier than 1939, an Inter-Governmental Conference on Anti-malaria Drugs, which would examine the following problems; present production as compared with world requirements, cost of production and market

prices ; relative costs of a plan of co-ordinated measures of treatment and prevention by the administration of drugs ; methods of distribution.

Plague.

INTRODUCTION

In dealing with the plague problem, two questions of primary importance arose—i.e., (1) housing improvements and (2) vaccination.

The considerable importance of vaccination emerged clearly both during the discussions and in the resolutions. It has been generally recommended that all Far-Eastern countries should adopt a policy of vaccination ; at the same time, it was emphasised that stringent control and scrutiny of the methods applied and of the statistical data obtained was essential. Exchange and supply of cultural material will be necessary. It is hence very desirable that the various Far-Eastern Institutes engaged in the investigation of the plague problem should be brought into closer contact to ensure the necessary mutual assistance and cross-checking of results. The way in which this collaboration might be arranged could be considered by the Eastern Bureau at Singapore, which could also take up the question of the control of land transport as contemplated in proposal No. 2.

RESOLUTIONS.

1. *Since the tendency of pandemic plague to diminish in some parts of the world is offset by the possibility of its development elsewhere, and since, moreover, there is a growing danger of the dissemination of plague through the agency of modern communications, which are rapidly increasing throughout the world, the rural plague problem remains of great importance. It is therefore incumbent upon the Government concerned to maintain the strictest vigilance by keeping their health services and permanent anti-plague organisations adequately provided with the necessary material and personnel.*

2. *In addition to the recognised methods of preventing the outbreak and spread of plague, such as rat-proofing of ships and*

buildings, the attention of the Advisory Council of the Eastern Bureau at Singapore should be drawn to the need for applying measures of control to rail, motor and other forms of land transport.

3. *Apart from the destruction of rats (and rat fleas) by trapping, poisoning, fumigation, etc., the Conference emphasises the necessity for improvement of existing dwellings and for the construction of new houses based upon ratproof designs. The Conference recommends that Governments forward to the League Eastern Bureau at Singapore, for distribution to other administrations, any plans and designs they may approve from time to time. The Netherlands Indies Government has set an excellent example with its improved bamboo dwellings, and similar principles may be applied in communities where timber, mud, straw and the like are utilised.*

4. (a) *The Conference strongly recommends that mass vaccination be widely adopted in plague-infected areas and that statistical data be carefully compiled on a uniform basis.*

(b) *In view of the encouraging results obtained in Java by the use of a non-virulent live vaccine, it is strongly recommended that any country carrying out similar work should use a strain duly approved in respect of its antigenic power, and should apply the standard technique.*

(c) *At the same time, it is desirable to collect further statistical data regarding the results obtained with heat-killed vaccine.*

5. *For all the purposes set forth in 4 (a), (b), (c), above an exchange of technical information between the institutes concerned would be of great advantage.*

Ankylostomiasis.

INTRODUCTION.

The work on the prophylaxis and treatment of ankylostomiasis undertaken in the majority of Eastern countries at the instance and with the help of the Rockefeller Foundation is too well known to require further comment.

That the campaign against ankylostomiasis is an excellent means of spreading health education, particularly if the help

of teachers can be enlisted, is a statement to which all public health workers in the East will subscribe.

Before the resolutions were passed, there was some discussion as to whether mention should be made of the possible toxic effects caused by the commonly used drugs particularly when administered to an ill-nourished population. The Technical Group to which this question was referred decided, however, that there was no reason to do so.

RESOLUTION.

The Conference recommends the following measures for the combating of ankylostomiasis, in addition to general educational and hygienic measures.

I. Treatment :

(a) *Mass treatment and re-treatment should be given only to population groups in which harmful effects resulting from the infestation are clearly discernable*

(b) *Individual treatment should be given as a matter of course to all persons on admission to a hospital or an institution, in which such treatment can be given as part of the general routine.*

II. Prophylaxis :

(a) *Prevention of soil infestation being of paramount importance, the extensive building of latrines, if possible one to every house, seems to be the only permanent method of control. Governments should give assistance to further the building of latrines ; their use should be encouraged by propaganda.*

(b) *More attention should be directed to the possibility of influencing the diet of tropical populations with the object of ensuring a sufficient intake of iron. Emphasis may perhaps be placed on iron contained in animal foods.*

Tuberculosis.

INTRODUCTION.

During the last few decades, attention has repeatedly been drawn to the increase in the incidence of tuberculosis in Eastern countries. This does not mean, of course, an absolute increase

in the incidence of tuberculosis. In several countries, enquiries have been undertaken with a view to the more accurate determination of the incidence of latent or clearly characterised tuberculous infections and the manner of infection. These researches, which are difficult to carry out, have remained fragmentary and do not so far warrant many generalisations or comparisons with the data obtained in Europe. The impression which emerges with increasing clearness from these enquiries is that, in most countries, tuberculosis has already become one of the most important social diseases, and that it constitutes one of the most serious and urgent health problems in Asia.

Apart from this, however, it should be stated that, in nearly all countries (except Japan), only a beginning has been made with anti-tuberculosis work. The resolutions therefore give no more than a general indication as to the lines on which such anti-tuberculosis work will have to be developed. The last resolution recommends, in general terms, that a greater measure of international co-operation may be achieved in the future.

In the course of the discussion, the delegate for Indo-China strongly emphasised the great importance of B.C.G. vaccination for the countries of Asia and to the favourable results so far obtained by this method. Moreover, he endeavoured to convince the other members of the technical group of the simplicity and innocuity of this method of vaccination. The other members were of the opinion, however, that the results of further investigations must be awaited before this method can be finally introduced in Eastern countries. Moreover, all members were not convinced of the real innocuity of the method. The French delegate tabled a resolution on B.C.G., which failed, however, to secure the acceptance of the technical group. The resolution read as follows.

“ Vaccination against tuberculosis by Calmette and Guérin’s B.C.G. vaccine, which has been applied in Indo-China on a large scale for twelve years, constitutes a method of prophylaxis, so simple, innocuous and effective that it is worthy of study on the part of the Far-Eastern countries in which it is not currently practised.”

7. *It is essential that, in Asiatic countries, complete and accurate data should be collected regarding the incidence and severity of tuberculosis.*

8. *Tuberculin tests and the method of appraisal of results should so far as possible be standardised on an international basis. Attention may be drawn to the method used for tuberculin tests in the Netherlands Indies. (See Appendix.)*

9. *Tuberculosis surveys may be carried out in villages to determine the incidence of the disease and the source of fresh infections.*

10. *The Conference strongly recommends that plans for a campaign against tuberculosis and schemes be drawn up, and carried out, in so far as resources permit, by the Governments of all countries in the East.*

The Conference further recommends that, when such plans have been worked out, they should be sent to the Eastern Bureau of the League of Nations at Singapore for communication to the other administrations. The question could be placed upon the agenda of the annual session of the Eastern Bureau Advisory Council in 1939.

Appendix.

DRAFT OF " RULES FOR MASS-RESEARCH OF TUBERCULIN SENSITIVENESS "

PREFACE.

Notwithstanding the public interest in the tuberculosis problem in the Netherlands Indies, information as to the frequency of tuberculosis in the archipelago is very incomplete. Only in a few places intensive investigations as to the amount of tuberculous infection have been made and little is known as to the conditions amongst the mass of the population. Needless to say, this is a serious handicap in any campaign against the disease.

Of the methods suitable for studying the amount of tuberculous infection in a given area or in a certain group of the population, tests for tuberculin sensibility are the most simple. This gives more scope than any other method, clinical and pathological, and allows of the examination of a greater number of persons within a short time with little trouble and at small expense. Under primitive conditions, it is, moreover, the only

method with which satisfactory results can be obtained, and most of the knowledge regarding the frequency of tuberculosis in the Netherlands Indies is based on mass research with tuberculin tests.

Such mass investigations, however, lose much of their significance when a comparison is impossible owing to the different investigators having performed the test each in his own way. Unfortunately, the technique of tuberculin tests permits of divergences. Not only is there a choice between Mantoux and Pirquet, but opinions differ moreover as to the degree of dilution of the tuberculin to be used, as to the interpretation of the reaction (negative, positive and dubious) and as to the lapse of time after which the reaction should be read. Almost every investigator has his own technique, and it is no exaggeration to say that, in the Netherlands Indies, chaos prevails, but not more than elsewhere.

For these reasons and in view of the fact that in the Netherlands Indies it may be possible to gain more accurate information, the Tuberculosis Study Committee, instituted by the decree of His Excellency the Governor-General, of October 26th, 1935, has taken as first point of its programme the determination of a standard method for mass examination for sensitivity for tuberculin. The instructions to be found below may be considered as an epitome of the laborious and difficult investigations conducted by Mrs. Otten-van Stockum at the Institut Pasteur at Bandoeng and by Dr. de Haas, of the Medical School at Batavia. These instructions are detailed, as experience and the study of literature have shown that slight differences in the execution may greatly affect the results. These rules will not, however, be universally accepted, as a number of investigators will undoubtedly retain their own methods.

The Tuberculosis Study Committee urgently appeals to all interested in tuberculosis, whether they are in Government service or in private practice, to follow these instructions closely regardless of personal opinion. The Committee is fully aware of the fact that this will restrict to a certain extent the freedom of scientific research, but they hope this sacrifice may be made in order to obtain comparable results.

It should be pointed out that these instructions *refer entirely to mass research*, by which the Committee understands an investigation on such a large number of persons, that differences of 10 to 15% are statistically significant—*i.e.*, on at least 200 persons.¹ An individual tuberculin test for diagnosis is outside of the scope of the Committee and its method of application is left entirely to the judgment of the attending physician.

¹ Under certain circumstances—*e.g.*, on a remote island, in an isolated hill village, and generally in closed communities—investigations on a smaller number of persons may still be valuable; also in cases where reinvestigation on the persons concerned is planned within a certain lapse of time (barracks, public schools, etc.) the minimum may be under 200. In similar cases, the Committee is willing to give advice in scheming the research and in working out the results.

Moreover, in detailed tuberculin research, when testing persons of a definite group, with different dilutions of tuberculin in order to determine the *grade* of tuberculin sensitiveness, the Committee does not deem it advisable to lay down rules. It is, however, necessary to *start* such detailed investigations with the standard method, so that at any rate the first part of the investigation can be compared with investigations elsewhere. For advice regarding such investigations, workers may communicate with Mrs. Otten-van Stockum or Dr. de Haas, or the Secretary of the Committee (office, Head Provincial Medical Service, Batavia).

The value of the research is to no small extent dependent upon the way in which the results are recorded and worked out. In this respect, accurate work is essential and all details which can possibly bear upon the problem of tuberculosis should be recorded. In view, however, of the different and often primitive conditions, it is as yet impossible to lay down rules in this respect.

SIGNIFICANCE OF THE TUBERCULIN TEST.

A positive tuberculin reaction is caused by a hypersensitiveness (allergia) of the skin for tuberculin, as a result of the fact that at some time the organism has been infected with tuberculosis. An enquiry into its frequency is therefore of great value in estimating the density of infection in a given district or in a given group of the population. *It should be mentioned that the positive reactor may not be actually suffering from tuberculosis. In the majority of cases, the body has overcome the infection and a positive reaction is left only as evidence of former infection.* What proportion of positive reactors is suffering from tuberculosis cannot be inferred from the tuberculin test; and can only be ascertained by clinical research. Consequently, the tuberculin test is only an indication of the density of infection in the group concerned.

Roughly speaking, the tuberculin skin test may be considered specific, provided it is carried out and interpreted correctly. The few cases in which the test becomes negative in the course of years are of as small importance in mass research as the considerable decrease of sensitiveness which may occur under the influence of diminished physical resistance —e.g., in serious tuberculosis of the lungs a short time before death.

CHOICE OF STANDARD METHODS.

In adopting a standard method, the Committee started from the following points of view :

- (1) The actual percentage of the persons infected with tuberculosis should be determined as closely as possible ;
- (2) The operations should be simple and easily carried out, even under primitive conditions ;

(3) The danger of any mistakes occurring in the operation and the reading of the results should be as small as possible ;

(4) The work should offer a minimum of inconvenience to the population examined.

It is of course impossible to find a standard method completely covering these four conditions, especially the case of (1) To increase the accuracy of the test to such a degree that the actual percentage of persons infected is very closely approached—the possibility of attaining the full 100% is an illusion—a concentration of tuberculin must be used which is incompatible with the other three conditions In applying the standard methods, it is therefore unavoidable that certain persons infected, with very low sensitiveness, are wrongly noted as negative reactors. The actual number of these persons cannot be calculated, but probably is of small importance It may, however, be assumed that the proportion of these apparently negative reactors to those registered as positive will be about the same in different investigations Although, therefore, the percentage of the positively registered reactors may be below the actual percentage of positives, these two percentages generally remain parallel.

Nor can the other three conditions be fully complied with and the Committee is fully aware of the fact that the standard methods for mass research fixed can only be a compromise

Practically, only the reactions according to the methods of von Pirquet and Mantoux can be used and, in applying the latter, it is necessary to consider what dilution of tuberculin should be used

The reaction of Mantoux is to be preferred to that of von Pirquet, as it allows for the use of more accurate doses and, as after practice, it can be executed more quickly and causes less pain Moreover, persons tested cannot wipe off the tuberculin, and the chances of infection in the punctured wound and of faulty reading are considerably less As *first standard method*, the reaction according to Mantoux has therefore been chosen, using a dilution of 1 : 10,000. In this manner too, strong reactions menacing the co-operation of the population are prevented

For this method, tuberculin of the Institut Pasteur at Bandoeng should be used, as this tuberculin has proved in comparative analyses to be equivalent to international standard tuberculin.

The reaction according to Mantoux undoubtedly requires more careful preparation by the investigator and his assistants than the reaction according to von Pirquet, but with some good-will it can be executed everywhere, even under the most primitive conditions.

A *second standard method* is the simultaneous application of the above-described Mantoux reaction and the Pirquet reaction : the Mantoux is applied on one arm, the Pirquet on the other. If they are applied strictly simultaneously, these reactions do not affect each other. For the Pirquet method the Bandoeng tuberculin should be used. This second method provides comparison with former investigations which were

exclusively carried out with the Parquet method, while at the same time comparison with the first standard method is made possible. Moreover, in this way more data are obtained than in the case of the first method. For this reason, the second method is to be preferred wherever there is sufficient time and opportunity.

READING THE RESULT.

In conformity with the international general conception, a palpable induration of a diameter of 5 mm., independent of redness, has been chosen as the limit between the negative and the positive reaction. In case of doubt, the reaction should be considered negative.

A differentiation of the positive reactions in various degrees, such as +, ++ and +++, is better left out of the standard method, it is too subjective for computing the results of several investigators. Moreover, it only creates an apparent exactness and entails considerable work in making the reactions and working out the results. Of course, a worker attaching great importance to a similar differentiation can readily perform this differentiation along the lines of the standard method, but it should not be introduced under the general rule.

Control-injections with tuberculin-free fluid are not advisable in case of mass investigations. Their value is very small as compared with the extra trouble which they impose upon the investigators and the population.

CONTRA-INDICATIONS.

Generally speaking, it is not desirable to apply the tuberculin test on persons who have been inoculated with vaccinal virus, or vaccinated against typhoid, paratyphoid, plague, cholera or any other infectious diseases less than a month before. Research should be postponed in areas where an epidemic or serious endemic of typhoid, malaria, influenza, measles, yaws, etc., prevails, or where many skin diseases occur. In cases of malnutrition, it is possible that the intensity of the tuberculin sensitivity so diminishes that, with the prescribed methods, too low figures will be found. This in itself is no reason why the investigation should be postponed, but makes a repetition advisable, when the nutritional conditions have been improved.

RULES FOR THE STANDARD METHODS.

1. *First Standard Method, Mantoux 1 : 10,000.*

For the application of this method, two or three assistants are required.

1. *Requirements.*

- | | | |
|---|----------------------|------------------------|
| (a) Necessary — 2 syringes of 1 cc each | } to make dilutions. | |
| 3 needles No. 12 | | } to be kept separate. |
| 2 flasks of 100 cc. each. | | |

- 2 funnels of 5 cc diameter each
- 6 calibrated syringes of 1 cc each (if possible, with eccentrically placed mouthpiece)
- 24 needles No. 18
- 2 or more bottles of 2 cc each with A T Bandoeng diluting fluid in bottles of 250 cc
- 2 basins or tins
- Some anatomical bottles of 250 cc
- Sterile gauze or sterile towels
- Methylated spirit, ether (beware of fire) or benzine
- Cotton
- Whetstone for needles
- 2 spirit lamps
- A portable case for the above apparatus

- (b) desirable — standardised registration cards
- Case for sterilised utensils
- Sterilisation according to local conditions

2. *Tuberculin dilution*

First 1% tuberculin as follows: 1 cc undiluted A T is put into a sterile 100 cc receiver with the syringe and needle, specially kept apart for this purpose (*vide* Requirements sub(a)). The funnel is placed on the receiver and the contents are diluted with the diluting fluid up to 100 cc. From this 1% tuberculin a tuberculin solution of 1:10,000 is made in the same way, another receiver being used with the second syringe and needle (*vide* Requirements sub(a)).

Diluting fluid: 1½% phenol, sterile NaCl solution 0.9%

3. *Storage*

The undiluted tuberculin can be kept for any length of time. The 1% tuberculin must if possible be kept in the ice-box, in 10 cc bottles; it keeps two to three weeks. The tuberculin solution 1:10,000 does not keep and therefore should be freshly made prior to each investigation. The diluting fluid in bottles of 100 cc can be kept indefinitely.

4. *Performance of the test*

The persons to be tested are formed up in single file with bare left forearms. Between the file and the investigator is an assistant with methylated spirits, cotton wool and a bucket, who rubs the upper third part of the outer side of the left forearm with a piece of cotton drenched in methylated spirits and afterwards squeezed dry. The individuals to be tested are then led through a narrow passage—e.g., between benches or tables, under the supervision of a second assistant—towards the investigator, who stretches the clean skin and introduces the needle intracutaneously, in such a way that the opening of the needle and the

calibrated side of the syringe are turned upwards. The entire opening of the needle must be introduced into the skin. Next the hold on the skin is released and 1/10 cc. tuberculin 1 : 10,000 is injected : a white swelling follows. When efficient assistance is available and with sufficient experience, at least 50-100 tests can be made per hour.

5. Administration.

In the days between performing the test and reading the results, the cards are filled in by the clerk or teacher, etc. In case standard cards cannot be used, temperature is done as accurately as local conditions permit.

6. Reading the results.

Results should be read 24 hours after injection. Special mention should be made on the card, if such has not been possible. The standard cards are distributed in advance amongst the persons tested, who are placed into line, with bare forearm, card in hand. The investigator and his clerk are seated behind a small table, a second assistant standing in front of the table. The assistant takes the card from the person tested and lays it before the clerk.

The test is considered positive when a skin infiltration of 5 mm. or more is palpable, independent of redness. All other reactions are negative.

The investigator calls out the result : positive or negative.

II. Second Standard Method. Mantoux 1 : 10,000 plus Pirquet.

(a) Mantoux 1 : 10,000 as above.

(b) Simultaneously Pirquet on the right forearm.

For this method two or three assistants are required.

1. Requirements :

(a) Mantoux 1 : 10,000 see before.

(b) Pirquet : 2 or more small bottles A.T. Bandoeng.

Drills and pipettes with fine points, if possible,
adaptable to the opening of the bottles.

Cotton.

Methylated spirits.

Whetstone.

2 spirit lamps.

2. Operation.

The persons to be tested are formed up in a single file with bare right forearms. Between this file and the investigator is an assistant holding methylated spirits, cotton wool and a bucket, who rubs the upper third part of the outer side of the right forearm with a piece of cotton drenched in methylated spirits and afterwards squeezed dry. The persons to be

tested are then led through a narrow passage under the supervision of the second assistant, who applies a drop of undiluted tuberculin to the arm. Finally, the investigator pricks *through* the drop without drawing blood.

Dry for 2 or 3 minute,

3. *Administration.*

The same as with the Mantoux method

4. *Reading the results*

The same as with the Mantoux method

Pneumonia.

INTRODUCTION

The interest shown in pneumonia has not so far been proportionate to the gravity of the problem

The pneumonia problem in Asia has two aspects :

(a) Pneumonia in adults, occurring especially amongst labourers ;

(b) Pneumonia in children.

The Committee discussed only pneumonia in adults, and made a short and simple statement regarding this disease.

The Sub-Committee concerned decided not to discuss pneumonia in children, because it is not a primary disease, but a mere complication of other diseases in children. They agreed that it was responsible for at least 30% of the death rate amongst children, but that in this case the attack should be upon the various diseases and malnutrition ultimately responsible.

The Preparatory Commission referred in its report to a memorandum considered by the Advisory Council of the League's Eastern Bureau in 1931, which stated that --

" There certainly is now a tendency to pay more attention to pneumonia ; but the attempts made are still isolated and no general plan of campaign appears ever to have been

discussed. The drafting of such a plan would be entrusted only to a body of experts, comprising clinicians, bacteriologists and administrative officers, all fully aware of tropical conditions and possibilities."

The Conference recommends that the Advisory Council take steps to convene such a meeting and that the recommendations of the meeting be communicated to all Governments in the East.

RESOLUTION.

In most Eastern countries, pneumonia is one of the principal causes of death, especially among labourers exposed to changing conditions of temperature and overcrowding. As yet there is no form of specific treatment or method of prevention of which the value is universally recognised.

Further research on these problems is highly desirable. In this connection, attention should be given to the living accommodation of labourers and others, especially to that of newcomers.

Yaws.

INTRODUCTION.

The problem of yaws, essentially a rural disease, presents both social and economic aspects. These arise, however, not out of the mortality entailed, which is negligible, but out of the consequent incapacitation. The need for the early detection and treatment of the disease is universally acknowledged, especially since a *therapia magna sterilisans* is available. This calls for a network of dispensaries, or a sufficient number of mobile squads to cover the entire country.

The campaign against yaws should form a part of a comprehensive scheme of health propaganda and education; the prestige which the doctor gains by curing a sometimes repulsive and painful complaint will enhance the reputation of modern medicine among the inhabitants of rural areas and facilitate its spread.

RESOLUTION

While individual treatment of yaws with arsenical preparations causes the infectious manifestations of the disease to disappear, the Conference is of opinion that there is no conclusive evidence to show that yaws has ever been completely eliminated from any area by such curative methods.

Increased effort should be brought to bear with the ultimate object of complete eradication, such work to be carried out preferably on an experimental basis. As an example, the experiment made in the Netherlands Indies of treating a whole population group until the infectious manifestations completely disappeared can be mentioned. The Conference believes this to be a method worth further study.

The results of such experimental mass treatment in respect of the number of relapses and residual cases should be checked by regular re-inspections of the treated population, and the data published.

The Conference draws attention to the satisfactory results obtained by treatment with bismuth preparations as affording a possible means of reducing the cost of combating this disease

Leprosy.

INTRODUCTION.

At the present day, leprosy still remains one of the most difficult problems of Asia, not merely by reason of the number of people who are suffering from this disease, but also on account of the emotional associations which it has acquired in the course of its long history. For a long time, Governments left the care of lepers to public charity administered with the help of money grants, mainly by religious missions. It is only lately that public health authorities, confronted with the evidence of the wide prevalence and tenacity of endemic leprosy yielded by the investigations of medical and public health workers, have begun to take an active part in the anti-leprosy campaign.

The scientific knowledge required for this prevention of the disease is not yet completely available ; we do not know exactly

how leprosy is contracted and transmitted. In time, it may prove possible to eradicate leprosy by the methods currently employed at the present time by health workers.

In the course of discussion, some delegates urged that only expert workers fully acquainted with the disease could hope to solve the difficult problem of pathogenesis and transmission whilst others contended that only the co-operation of the workers in all branches of medical science can help to elucidate this question.

There are on every hand great differences of opinion, and some doubt as to whether present-day knowledge is not of more theoretical than practical value. Some efforts have been made to organise international co-operation in the study of leprosy. It may indeed be said that anything which will enable the value of the various theories to be tested will be welcome and will serve to promote progress in this field in which it is so urgently necessary.

The following resolution was adopted :

RESOLUTION.

1. *In the existing state of knowledge regarding the transmission of leprosy, the Conference is not in a position to recommend any definite plans for the combating of leprosy other than those which are already being applied in various countries, namely :*

(a) *Isolation in its different forms, e.g., in private houses, in huts outside villages or in colonies for all infectious cases. Isolation centres should be as numerous as possible so that treatment and care may in every instance be provided within a reasonable distance of the patient's home.*

(b) *Whatever treatment is adopted, due importance should be attached to adequate nutrition and physical occupation. Routine life in a colony should approach as near as possible to the ordinary conditions of village life.*

(c) *Every colony should include an actively working treatment centre, having regard to the fact that simplification of the problem of treatment is one of the main advantages of colonisation.*

(d) *Apart from the above measures which are of a specific character, an improvement of the social, economic and hygienic*

standards of rural populations will help to accelerate the eradication of leprosy.

(c) Leper colonies should be built and run on the simplest possible lines, every endeavour being made to ensure that the colony is as far as possible self-supporting.

Generous support on the part of all Governments and the co-operation of all local and non-official agencies are necessary. It would seem feasible to look to the local population to make contributions in kind for the support of the colony.

2. In view of the present state of our knowledge of leprosy, the Conference recommends intensive and continuous investigation, with special reference to transmission¹ and strongly urges all organisations and Governments concerned to supply financial assistance in support of this recommendation.

Mental Diseases.

INTRODUCTION.

In discussing mental diseases at a conference on rural hygiene, it was necessary to concentrate mainly on the social-economic side of the question, and to consider the methods which can be suitably applied in the care of mental patients, and how far these methods can be extended and developed.

The care of the mentally afflicted is a problem of growing importance, and there is an ever-increasing need for the provision of accommodation for this class of patient.

How far this need reflects a definite increase in the incidence of the psychoses need not to be discussed, since, even in Europe, it is extremely difficult to discover whether there has been a direct incidence of mental disease which cannot be accounted for by the growth of the population. It is, however, certain that the demand for institutional treatment is growing.

¹ (a) Transmission : intra-familial as opposed to extra-familial.

(b) The probable significance of external factors operating in the special foci of this disease.

(c) Experimental and laboratory work to elucidate its aetiology and pathogenesis.

The main reason for this may be a change in the social atmosphere in Asiatic countries, in which life is constantly becoming more strenuous. This results in an increasing desire to remove unwanted persons—which includes the mentally diseased—out of the circle of the family or clan and to provide for them in special institutions.

For these reasons, it was appropriate that the question of mental diseases should be included in the agenda of the Conference.

RESOLUTION.

It is a matter of primary importance that acute mental cases should be admitted as soon as possible to institutions able to provide proper medical care.

Such institutions include:

(1) *The ordinary hospitals for the so-called symptomatic psychoses caused by infections such as malaria, typhoid fever, pneumonia, syphilis, etc., as well as cases of acute confusional insanity, which are generally of short duration;*

(2) *Admission stations;*

(3) *Mental hospitals (asylums).*

The temporary accommodation of acute cases in circumstances precluding proper medical care should be avoided.

A system of immediate admission is possible only when all chronic non-dangerous cases can be rapidly discharged from asylums either to their places of origin or to agricultural and horticultural colonies. The system of colonies should be combined with the boarding-out of patients under proper control, in families in neighbouring villages. By this means, the cost can be considerably lowered and the readaptation of patients to normal village life facilitated.

The admission stations and the mental hospitals should be well staffed with medical specialists and equipped to train the personnel, more especially in occupational therapy. To ensure the speedy discharge of patients, it is essential that the area served by the asylum should not be too extensive.

Every medical student should receive elementary training in psychiatry in a psychiatric clinic attached to medical schools;

he should also be made familiar with the principals of sound occupational therapy. A course of training in a psychiatric clinic as well as in an asylum or a colony before the final examination is therefore a necessity.

Acute psychoses can be a danger to the community in general. Proper treatment of these cases either in general hospitals, admission stations or asylums is therefore in the interests of the community. The provision and financing of such care is therefore rightly to be regarded as the concern of the Government.

On the other hand, local communities which are mainly interested in removing troublesome cases and keeping them away from the village should share the cost of after-care in colonies in proportion to the number of patients from that particular locality.

Although the care of the insane should be decentralised, it is essential to have a central post from which an expert psychiatrist may exercise control over admission stations, asylums, colonies and the boarding-out of patients.

Propaganda and education must be applied to combat the idea, widespread in Eastern countries, that mental diseases are different from other diseases.

Chapter VI.

GENERAL RECOMMENDATIONS.

1. The Conference, considering that progress achieved in the several countries might with advantage be examined periodically and suggestions offered in the light of experience gained in the interval, *recommends* that the Rural Hygiene Conference for Eastern Countries should meet again five years hence.

2. The Conference *emphasises* the importance of ensuring that a sequel be given to its resolutions and, in particular, that its proposals for technical studies should be acted upon by the competent organisations of the League.

3. The Conference *records* accordingly that its report will be communicated to the Council and Assembly of the League of Nations, that its recommendations will be brought to the notice of the Governments through the intermediary of the Secretary-General of the League and will be examined by the Health Committee with regard to the action arising out of the resolutions adopted by the Conference.

4. In Chapter I, it is recommended that the Governments consider surveying all factors affecting public health of certain selected areas. The Conference *recommends* that to assist Governments in this work at a stage of the preparation of draft schemes for the areas selected, the League Health Organisation should collect and distribute suitable documentary material. Further, in order to ensure the uniformity which is essential if the data are to be subsequently compared, the Health Organisation is requested to maintain contact with the investigating countries throughout.

Arrangements might be made before the work is started for an exchange of draft plans, through the medium of the Eastern Bureau, and for a discussion between the investigators from the different countries.

Similar meetings might be arranged in the subsequent course of the work, and at its termination.

For this purpose, advantage may be taken of the sessions of the Advisory Council of the Eastern Bureau.

5. The conclusions of the Chapter on Rural Reconstruction entrust to the League of Nations arrangements to collect and make available information regarding successful examples of rural reconstruction in various countries.

To that end, the Conference *suggests* that the information be collected by a special group of persons who are closely engaged in such work. The group will visit various countries and make a special study of rural reconstruction centres. Its report should be published for general information.

6. Chapter III *suggests* a study of fly control under the auspices of the Health Organisation of the League and its integration with kindred investigations recommended by the First European Conference on Rural Hygiene.

7. The detailed suggestions made in Chapter 4 about Nutritional Research *are referred* to the Governments in the hope that they will inform the League Health Organisation regarding institutions which agree to co-operate in carrying out investigations of the type outlined.

The Conference further *suggests* that detailed reports on progress of studies should from time to time be sent to the Health Organisation of the League, if necessary, in their original language.

It is finally *recommended* that the technical report on nutrition be submitted to the League Technical Commission on Nutrition and that the Health Organisation should undertake to establish contact between that Technical Commission and nutrition workers in the East.

8. In adopting the recommendation of Chapter V on Measures for combating Certain Diseases in Rural Districts, the Conference *suggests* action by the League Health Organisation in regard to malaria, plague, tuberculosis, and pneumonia.

MALARIA. The Conference *emphasises* the value of the International Course of Malariology held at Singapore under the auspices of the Health Committee of the League of Nations. The

Conference *believes* that only officers experienced in malaria work should, by preference, be sent to this course.

It is also believed that the Health Committee might consider the possibility of giving a concurrent course for anti-malaria engineers at the same time and place, as well as the possibility of having a week's round table conference each year in which members of the League Malaria Commission resident in the East might usefully take part for the dual purpose of advising the Malaria Commission on studies and problems in the East, and of comparing the conclusions of any investigations undertaken by, or through them, on behalf of the League.

The Conference *welcomes* the proposal, under the Health Committee's three-year plan, for the Malaria Commission to consider the advisability of holding, not earlier than 1939, an Inter-governmental Conference on Anti-malaria Drugs, which would examine the following problems : present production as compared with world requirements, cost of production and market prices ; relative costs of a plan of co-ordinated methods of treatment and prevention by the administration of drugs ; methods of distribution.

PLAGUE. (a) The Conference *recommends* that the attention of the Advisory Council of the League of Nations Eastern Bureau should be drawn to the need for applying measures of control to rail, motor and other forms of land transport.

(b) It is also *recommended* that Governments forward to the League Eastern Bureau for distribution to other Administrations any plans or designs for the rat-proofing of dwellings and other buildings, which the Governments may approve from time to time.

(c) The Conference emphasises the great advantage of interchange of technical information between the institutions concerned :

(1) In regard to rendering uniform statistics of mass vaccination in plague-infected areas ;

(2) In regard to the standard methods and techniques of vaccination with non-virulent live vaccine (Java) and, finally, of further statistical data to be collected as to the results obtained with heat-killed vaccines.

TUBERCULOSIS. The Conference *recommends* that plans of an anti-tuberculosis campaign drawn up by the Governments of countries

in the East should be sent to the League Eastern Bureau for communication to other administrations and that the question be placed on the agenda of the 1939 session of the Advisory Council of the Bureau.

PNEUMONIA. The Conference *suggests* that, since no general plan of campaign against pneumonia has yet been elaborated, and since the drafting of such a plan could be entrusted only to a body of experts comprising physicians, bacteriologists and administrative officers, all fully aware of tropical conditions and possibilities, the Advisory Council of the Eastern Bureau should be requested to take steps for convening such a body and communicating the result of the meeting to all Governments in the East.

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